BETTER FRUIT

VOLUME IX OCTOBER, 1914 NUMBER 4

HARVESTING THE GREAT NORTHWESTERN BOX APPLE CROP
Picking Scene in Walla Walla Valley

BETTER FRUIT PUBLISHING COMPANY, PUBLISHERS, HOOD RIVER, OREGON

Subscription $1.00 per Year in the United States; Canada and Foreign, Including Postage, $1.50 Single Copy 10 Cents

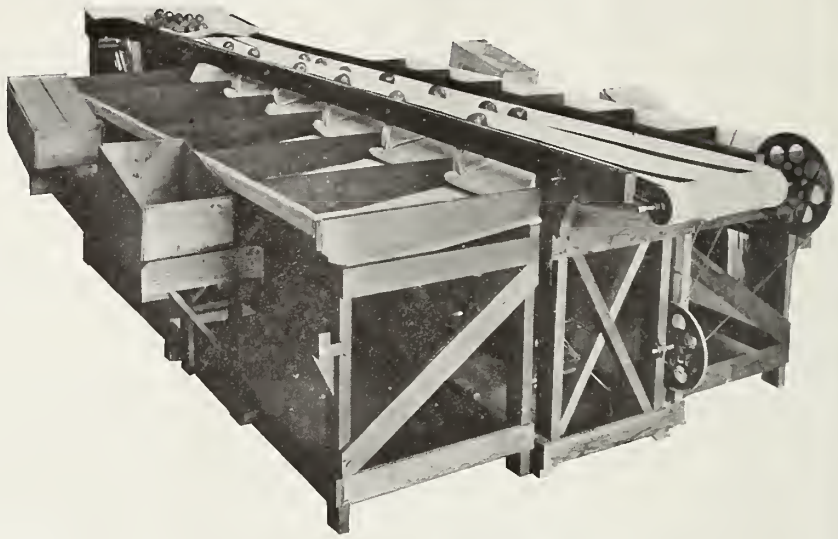
The Palmer Fruit Grader and Sizer

Price $125, f.o.b. Hood River

Including packing tables, all complete, except Electric Motor, which will be furnished for $15.00 extra

Makes two grades at the same time. Makes six divisions in sizes, which has been found by experienced orchardists and packers handling large crops to be absolutely the most practical number in division of sizes for efficient, rapid and economical packing.

Grades and sizes all kinds of fruit of all shapes and sizes—



Apples
Pears
Peaches, Etc.

Grades and sizes, absolutely eliminating bruising.

Can be adjusted at two points, so the bins will fill evenly, whether fruit runs to large or small sizes. The Palmer Grader and Sizer is the only machine so far as we know having this extremely important feature.

The construction is simple; a boy can operate it and keep it in order.

Small and compact. The Grader and Sizer, with packing tables set up ready for operation, including space for graders and packers, occupies floor space 12x18 feet. Can be easily moved through a door 2½ feet wide.

Sorts to sizes, so packers of limited experience can do good work. Increases the efficiency of packers 30% to 50%.

Will save in grading, sizing and packing from 3 to 10 cents per box. A grower with 2,000 boxes of fruit can more than save the cost of a Palmer Grader and Sizer in one season by using one, and do his work quicker and better.

Capacity 1,000 boxes per day

Send for further particulars and descriptive literature.

Will make arrangements for exclusive territory with dealers or agents.

Address

PALMER BUCKET CO., Hood River, Oregon

A Money and Fruit Saver

Ready to Empty

A Higher Standard Better Fruit

Successful orchardists of the Northwest are using the Palmer Bucket, because it prevents the bruising and saves time and money in emptying the buckets in field boxes.

Ask your dealer to show you how the bucket is operated—or send $1.00 and we will forward one by express.

Special prices on quantities of one dozen or more.

Will make arrangements for exclusive territory with dealers or agents.

Emptying

Address

PALMER BUCKET CO., Hood River, Oregon

EXCLUSIVE TERRITORY

BETTER FRUIT

AN ILLUSTRATED MAGAZINE PUBLISHED MONTHLY IN THE INTEREST OF MODERN, PROGRESSIVE FRUIT GROWING AND MARKETING

Pollination of Plants

By Dr. A. J. Cooke, State Commissioner of Horticulture, Sacramento, California

YOU will each and all recall the mechanism of a flower in its best development. As you know, each part of the floral envelope is a modified leaf. The close student often sees positive proof of this in a petal that is also at the same time a stamen. A double flower results from a reversion of stamens in a multistaminate flower like the rose back to petals. The outer circle of floral leaves—the sepals—are still leaflike as they usually retain the green color of the normal leaves. These sepals, except as they enfold and protect the bud, function solely as leaves. The next whirl of the floral envelope just within the calyx forms the corolla, which is made up of three or more variously colored leaves known as petals. These are what give beauty to the flower and are of real service to it in attracting insects to the important work of pollinating the flower, which is our theme at this time. Often the flower is very irregular, the separate petals varying greatly in form. This peculiar conformation, as Darwin explained years ago, has directly to do with pollination and so interests us greatly in this discussion.

Within the corolla are the stamens, the male equipment of the flower. These may be the same number as the petals when they are opposite or alternate with them. There may be a great number, as in most rosaceous flowers. Each stamen has a stem-like stalk, often thread-like, hence called the filament, and a head known as the anther. The anther bears the male element, the pollen, a fine dust of varying color, though more frequently yellow. Each pollen grain is a cell and corresponds to the sperm cell in animals. In the very axis of the flower we find the pistil, usually only one but sometimes as many as there are petals, and rarely, as in the strawberry, many. The pistil is the female organ of the flower. Its bulbous base is known as the ovary, which bears a slender appendage, the style. The latter is tipped with an unctious enlargement known as the stigma. In the ovary grows the ovules, the plant eggs if we may so speak—the female elements of the plant. Like the pollen grain and the egg, these are cells which, when fecundated by the pollen grain, develop into the seeds. The sticky unctious stigma captures and holds the pollen grains. From each pollen grain there develops a thread which pushes down the entire length of the style and enters an ovule. This is fecundation and is absolutely necessary to the formation of a seed. The seed is the partially developed plant—an embryo—and as the animal egg cannot develop without the sperm cell, no more can this ovule or plant egg without the presence of this pollen thread. We thus see that no fecundation, or in other words no pollination, is the equivalent of no seeding, usually no fruitfulness.

Many plants are dioecous; that is, each flower is either male or female, not both. Of such are the oak, the walnut and some varieties of strawberries. In some cases, as the pepper tree, the sexes are on different trees or plants.

Features of this Issue

In all such cases of course, even though a flower is fertile to the pollen of its own species, there must be marriage priests, as Darwin styled the bees, to carry the pollen from flower to flower or from tree to tree. In rare cases, as in some varieties of strawberries, all the plants are pistilate. Here pollen must be brought to them from other staminate plants.

In many monoecious plants where the flowers are perfect with both stamens and pistil in the same flower, the flowers are infertile, or will fail to fruit, or at least to produce seed unless cross-pollinated. We say such flowers are self-sterile, or sterile to their own pollen. Our clovers and many, probably most, of our fruits are of this class. Most irregular flowers are so formed as to require cross-pollination. The very conformation of the flowers prohibit self-pollination and insure cross-pollination through the visits of nectar-loving insects. Often plants like the Bartlett pear are self-sterile in one locality and fertile to their own pollen in another. I have reason to believe also that plants may at one time be self-fertile and the same plants at another time be self-sterile. It is also interesting to note that the pollen of some varieties is more potent than others of the same species. Thus among cherries the Black Republican, Black Tartarian and seedlings are found, in some sections at least, to be strong pollinizers. The same may be said of Drake's seedling among almonds. The experiments of the Oregon station show that the Bing, Lambert and Napoleon (Royal Ann) are inter-sterile. Of course in our planting it would be most convenient to set varieties in solid blocks, but it would not be wise or scientific. We should always mix varieties, being careful to select varieties that bloom at the same time, also to secure those that are interfertile. Suppose the Bing or the Lambert or the Napoleon are thought to be the most profitable varieties, then a few sour cherries, or Black Tartarian or other efficient pollinizers, should be sparingly intermingled with the more desirable varieties. The same is true of our almonds. If we wish the Ne Plus Ultra and the IXL, we may well mix in liberally here, as the Drake's seedling is a very desirable variety, for it has been found to be an efficient pollinizer. Very likely locality is important in this matter, and it is wise in planting to note what varieties are desirable for market and at the same time are interfertile each with the other in each locality. At present we are not sufficiently informed as to the potency of pollen from the several varieties of our fruit, but we know enough to make us sure that it is wise in all cases to mix varieties, and it may be wise in some cases to plant sparingly of undesirable varieties to make sure that we provide for efficient pollination.

From what we have seen above we note that efficient agents in this work of pollination must be good flyers, must desire and seek often the nectar of flowers and must be very numerous, as the flowers to be pollinated are multitudinous. In such flowers as the strawberry each blossom has several ovules to pollinate, and if any are missed the berry may be deformed. Of course all free-flying, sweet-loving insects are valuable to the horticulturist or agriculturist as collaborators in the pollination end of seed and crop production. All bees, honey, bumble and other wild bees, most if not all wasps, ants though handicapped by the absence of wings, many moths and most butterflies, such diptera as syrphus flies, nectar-loving beetles and not a few homoptera aid in this work of pollination.

In purely natural conditions there is a pretty safe balance, so that this service is provided for. The native insects suffice to pollinate the wild flowers of plain and forest. In our alfalfa fields and great orchards we have so massed the plants that the native insects are all powerless to perform this neeessary function. Australia had no bumble bees and red elover would not seed until the bumble bees were introdueed. The long flower tube plaeed the nectar beyond the reach of most insects. Even in Europe and America bumble bees are very scaree in the early season, and so we depend on the second crop for seed. Our alfalfa blooms are worked on by honey bees, and so any crop is fruitful of seed if honey bees are present in great numbers, but here the bloom is like the sands of the sea, and this is why we need the apiary close by the alfalfa field if we are to produce seed. It is usually wise to save the second, third or fourth crop for seed, not only to escape damaging rains but also that we may be sure that swarms of bees may properly pollinate the bloom. What a wealth of bloom of beauty erowns the orchard trees as they fling out their signal ery to all passing insects to eome and dine and extend to them a life-saving service. How often our fuit trees bloom full only to set no fruit. No pollination, no fruit; no bees, practically no pollination. We see then that we must not only mix our varieties wisely, but we must secure bees in the near preeincts of our orchards if we would secure large and profitable crops. As we have seen, generous cross-pollination is not only required for full crops, but perfect fruit often requires the same interpollination in field, garden and orchard.

We have a strange abnormality in the navel orange. The stamens produce no pollen; the fruit bears no seeds. Did the seeondary orange which results in the navel estop the pollen thread in its way to the ovule and thus cause seedlessness? In this ease, why does the tree still fruit? Oecasionally other citrus trees exhibit the same behavior and a few vegetables are known to fruit without seeding. In these cases absence of pollination doubtless explains absence of seeds, but why the exceptional result of fruiting is yet to me at least a real puzzle.

As bees are the friends of the fruitgrower and of the rancher in general, we should foster their presence and well being at or close by the ranch. This as well as the best sueeess in spraying for the codling moth will preclude spraying for this insect until the blossoms (petals) of apple, pear and quince fall from the tree. This is the proper time, and earlier spraying often kills not only the adult bees but also the brood. We all ought to adopt the motto, "Never spray our orchards with arsenites until the blossoms fall," and preach this to all our neighbors. We must remember that bees are the good and neeessary friends to the suecessful pomologist. We should also remember that bees never injure sound fruit, but are fond of ripe fruit and are quick to attaek it when other inseet, bird or weather wounds it.

A word regarding pear blight. It is quite eertain that fireblight and twig blight of pome fruits are spread rapidly by inseets, and bees of course aid in this dispersion. We have all observed how rapidly pome blight spreads at the season of bloom in pear, apple and quince orchards. That bees are the most numerous visitors of the flowers at this time is of course true. That the germs of the disease are thiek in the neetar is also unquestioned. Yet other insects are just as able to earry the blight germs as are bees, and are sufficiently abundant to do most serious harm. If the bees were removed, the blight would spread very likely as rapidly and work as fatally as with the bees swarming on the bloom. Other inseets abound sufficiently to spread the blight, but not in numbers requisite for proper pollination of the bloom or full produetion of fruit.

In years like the present we shall always find it neeessary to fight this insidious bacterial disease in case it is present in our neighborhood. The great and effective cure is very thorough pruning, so thorough that every vestige of the diseased tissue is removed from twigs, branches, trunk and roots, and we must be equally insistent that after each eutting, chisel, knife or shears is thoroughly disinfected by use of a one-to-one-thousand solution of corrosive sublimate — bichloride of mercury.

Co-operation of Ozark Fruit Growers

The satisfaction of the fruit growers in co-operation is evideneed by the fact that in 1912 the Ozark Fruit Growers' Association of Monett, Missouri, handled fruit from twenty-seven different loading stations and increased to forty-seven stations in 1913.

Blight in some districts of the Northwest has been rather more serious this year than in the past, while in other distriets no eases of blight have been reported. In the distriets where blight is prevalent an aggressive eampaign has been organized for the purpose of eontrolling the disease.

Correct Cost of Orchard Management

[Office of Information, United States Department of Agriculture]

WHAT does it cost to run an orchard? Plan of eost accounting for apple-orehard operation for fruitgrowers wishing to find out the annual eost of managing an orchard has been outlined by the United States Department of Agriculture. The method presented is the result of records covering nineteen years' work in several New York orehards. The bulletin gives details for two years' work on one of these orchards. The method is applieable to all similar operations. The orchard for which the details are given is over fifty years old and well located for the production of fruit. It consists of nearly fifteen aeres and contains 527 trees. The total annual cost of the operation of the orchard during the two years eovered by the detailed studies was divided into labor, eash and fixed eosts. Nine hundred and thirty-seven marketable barrels of apples were produced the first season for a total operating cost of $1,217.92. Two thousand one hundred and four barrels were produeed the seeond year at a total expense of $2,125.69. In the table given below, the labor costs refer to the man and horse labor; the cash costs cover the expense of manure, spraying, barrels and seed for cover crop; the fixed costs included the use of machinery, land rental and overhead expenses. The distribution of costs in the orchard during the two years was as given in Table I.

Two elements of cost have not been measured in these estimates, namely, the cost of creating the orchard and the depreciation of the orchard as its produetion declines as the result of advancing age. The presenee of insect pests and fungous diseases and the thoroughness of their control also will have their influenee on the life of the orchard. The two years' study on the farm in question have not yielded sufficient data on this particular item to warrant definite eonclusions. All apple growers, therefore, should bear this factor in mind. The item ineluded under "fixed" costs should vary little from year to year. The land rental, including interest and taxes, is about six per cent. For this partieular orchard it will be noted that the fixed eosts approximate twenty dollars a year per acre. The details of the items of cash costs are as shown in Table II.

The cost of growing apples is lessened by growing them in eonnection with other farm crops and utilizing the man and horse labor on these other crops when they are not needed in the orchard. The experiences of the best apple growers in old apple-producing regions indicate that proper management of a well-diversified farm is as important a factor in profitable apple raising as the use of different cultural methods, reduetion of packing cost, or even eheaper wages for help.

The farm in question eonsists of 122 acres. Fifty per cent of this area is devoted to general crops other than fruit, and of the 39 acres devoted to fruit only about 15 are used for apple raising. Enough hay, oats and corn are raised on the farm for feed. Potatoes are raised, but only for home use. Wheat and beans, as well as the fruit, are cash crops. Each year twenty or thirty sheep are kept and pastured during the summer. Lambs are raised and fattened during the early spring months. Six horses are kept for work and one for family use. One or two colts are raised each year.

The aetual costs given are not the most important result of this study, as

other farms in the same community might show quite different results. The method of analyzing the various cost factors is the feature that is of most practical value. The Department's new publication aims to outline for the independent apple grower a method that will enable him to determine the actual cost of maintaining and operating his fruit enterprise on his own farm. It does not attempt to give a concrete example of just what the costs will be. Beside the fact of the depreciation of the apple orchard alrcady mentioned, other factors such as the variety, age and size of trees, the soils and the climate will influence the actual costs, but not the method of analyzing these costs. Apple growers will find much to interest them in the new publication which is being sent free of charge to such persons as apply for it.

TABLE I

Item of Cost	Total	Per acre	Per tree	Per bbl.
First Year:				
Labor	$504.91	$34.254	$0.958	$0.539
Cash	418.10	28.364	.793	.446
Fixed cost	294.91	20.007	.559	.315
Totals	$1,217.92	$82.625	$2.310	$1.300
Second Year:				
Labor	$856.66	$58.118	$1.625	$0.407
Cash	966.57	65.574	1.834	.459
Fixed cost	302.46	20.520	.574	.144
Totals	$2,125.69	$144.212	$4.033	$1.010

TABLE II—CASH COSTS ON 14.74-ACRE APPLE ORCHARD, CONTAINING 527 TREES, FOR TWO YEARS

Item of Cost	Spray	Distribution of Cost: Total	Per acre	Per tree	Per bbl.
First Year:					
Manure charge (50% against 1911 apples)	....	$ 30.77	$ 2.087	$0.058	$0.033
Spray materials used:					
First spraying—					
Lime and sulphur, 40 gals. at 4 cents*	$ 1.60				
Lime and sulphur, 100 gals. at 16 cents†	16.00				
Tobacco extract, 3 pints, at $1.652	4.69	24.85	1.686	.047	.026
Lead arsenate, 32 lbs. at 8 cents	2.56				
Second spraying—					
Lime and sulphur, 43 gals. at 16 cents	6.88				
Lead arsenate, 102 lbs. at 8 cents	8.16	15.04	1.020	.029	.016
Third spraying—					
Lime and sulphur, 32 gals. at 16 cents	5.12				
Lead arsenate, 77 lbs. at 8 cents	6.16	11.28	.765	.021	.012
Fourth spraying—					
Lime and sulphur, 15 gals. at 16 cents	2.40				
Lead arsenate, 36 lbs. at 8 cents	2.88	5.28	.358	.010	.006
Barrels, 937, at $0.311	....	291.41	19.770	.553	.311
Seed for cover crop‡	....	39.47	2.678	.075	.042
Total for season	....	$418.10	$28.364	$0.793	$0.446
Second Year:					
Manure charge (30% against 1912 apples)	....	$ 18.46	$ 1.252	$0.035	$0.009
Spray materials used:					
First spraying—					
Lime and sulphur, 80 gals. at 4 cents	$ 3.20				
Lime and sulphur, 75 gals. at 14 cents	10.50	13.70	.929	.026	.006
Second spraying—					
Lime and sulphur, 44 gals. at 14 cents	6.16				
Lead arsenate, 105 lbs. at 8 cents	8.40	14.56	.988	.028	.007
Third spraying—					
Lime and sulphur, 52½ gals. at 14 cents	7.35				
Lead arsenate, 126 lbs. at 8 cents	10.08	17.43	1.182	.033	.008
Fourth spraying—					
Lime and sulphur, 35 gals. at 14 cents	4.90				
Lead arsenate, 146¾ lbs. at 8 cents	11.74	16.64	1.129	.031	.008
Barrels, 2,104, at $0.421	....	885.78	60.094	1.681	.421
Total for season	....	$966.57	$65.574	$1.834	$0.459

*Undiluted home-made solution: 36 lbs. lime, 80 lbs. sulphur, 50 gals. water. The cost of labor is included. Rate of dilution, 1 gal. lime and sulphur solution to 7 gals. water. †Undiluted commercial lime and sulphur: Rate of dilution, 1 gal. lime and sulphur solution to 10 gals. water. ‡Items of seed cost: Clover, 180 lbs. at 16c; oats, 22 bu. at 40c; turnips, 7½ lbs. at 25c.

Conditions Affecting Blight and Their Control

By Deane B. Swingle, Bacteriologist and Botanist, Montana Agricultural College

ONE of the most striking things about blight is its very different behavior under different conditions. This has led to an apparent disagreement of observations and a real disagreement of opinion, especially among those who have seen it in only one locality. Of the conditions that affect the severity of blight we have two kinds—those that influence the number of cases and those that influence the severity of the cases. Under the former should be listed factors responsible for the spread:

(a) "Holdover" Cases—The work of Mr. M. B. Waite and others has demonstrated that all, or nearly all, the new cases that appear each spring come from old ones where the organisms have survived the winter in that part of the bark where the diseased part joins the healthy. Some of these "holdovers" may be found in the orchard, where they are responsible for a local spread, and others occur on nursery stock and may carry the disease for hundreds of miles.

(b) Insects that accidentally take the disease germs from one case and start new ones. Of these the honey bee, ants, green aphis, bark-boring beetles and pear thrips have been accused by good authorities of being important carriers.

(c) Birds—Certain investigators, including the writer, have observed new cases of blight in pear trees, starting from fresh sap-sucker wounds in the bark. As these trees were in some instances well isolated from other cases, it seemed probably that the bird was responsible.

(d) Pruning Tools, etc.—It has been demonstrated repeatedly that if we cut an active case of blight and then cut through a healthy limb, the latter may become infected. The percentage of such cuts that will result in new infections is much higher in summer than winter.

(e) Bloom—Repeatedly we have seen hundreds of cases of blight in a single tree from blossom inoculations. Also we have seen trees that failed to bloom almost free, while their neighbors that had blossomed showed many infections. Varieties that bloom early sometimes escape blossom infection, because the blossoms have fallen before the insects had had a chance to visit any of the bacterial exudate from the "holdover" cases, which sometimes do not give forth this liquid until an unusually warm day.

(f) Water Sprouts or Suckers—These are very tender and more liable to attack than slow-growing twigs. When growing around the base of the tree or upon large limbs, they often bring about the death of the tree by giving the blight a start near a vital region.

(g) Crown-gall—It has been observed repeatedly that galls are readily attacked by blight and trees thus attacked are badly damaged or entirely killed.

(h) Susceptibility of the Tree to Inoculation—It is a fact well known to plant pathologists that we inoculate a tree by wounding the bark and inserting virulent blight bacili, or by putting them inside freshly-opened flowers, the disease will sometimes follow and sometimes not. Briefly, we may mention that some varieties are easier to inoculate successfully than others and that in a susceptible variety the disease is more readily produced in summer than in winter, in hot weather than in cold, in rapidly-growing parts than in slowly growing, and in small limbs than in large ones.

Of these conditions that influence the severity of blight after the attack is made there are at least five.

(1) Variety—This is the most important of all these factors. Perhaps no varieties are entirely immune, but some are so nearly so that they never suffer more than a little twig blight under ordinary circumstances, while in others, like the Alexander and Transcendant Crab, the disease runs into the large branches and trunks, even when the other conditions mentioned below are quite against the progress of the disease.

(2) Soil fertility.

(3) Soil moisture.

(4) Temperature.

Anything that contributes to a rapid growth of wood makes the tree more susceptible, and a rich soil under a high state of cultivation and abundance of moisture and hot growing weather, all work to this end. Dry, sod-bound, upland orchards often resist the blight so well that no attention is ever paid to it.

(5) Age—Young trees just coming into bearing seem to suffer most, while very old trees with slower growth and thicker and harder bark resist it much better.

These facts explain in a measure why the disease will in some trees die out in the small twigs without injuring large limbs, while in other trees it will run through the bark to the roots.

Control—In a single sentence we can say that the only method of curing a blighted tree is to cut out and burn all the affected parts. This seems simple enough, but there are important details that determine between success and failure. As a matter of fact very few inexperienced men are successful, largely because they will not pay close enough attention to these important details. The following rules should, therefore, be thoroughly mastered and religiously followed:

(1) See that no blight is allowed to winter over in the trees. The most effective time of the year to cut it out is late fall or early winter, though summer cutting is advised also.

(2) In the dormant season the blighted branch should be cut off about a foot below any visible portion of the disease; in the summer two or three feet below. Even if this necessitates cutting off a larger limb it should be done. It is this rule that is transgressed most often and with the most serious consequences.

(3) After each cut the saw or shears must be disinfected. The disinfectant can best be carried in a milk bottle attached to a belt, and can be applied with a swab. Small corrosive sublimate tablets (four to a pint of water) make an excellent disinfectant. A 5 per cent solution of carbolic acid is also good.

(4) Burn all diseased parts promptly after cutting, especially in summer. It is a general belief that insects crawling over such material may reinfect the trees.

(5) Inspect every tree carefully after the orchard has been gone over. Even an expert, when cutting out blight, has to do this two or three times to get every case, and a case or two left may ruin the whole campaign by starting the blight in the blossoms the next season. A reinspection should always be made just before the buds open, as missed cases are often more easily found at that time. Never omit this.

(6) Pruning—Orchards in infected districts should be kept free from watersprouts at the foot of the trees, and from suckers and fruit spurs on the main limbs; otherwise the bacteria, entering through these tender parts, will quickly reach the roots or trunk.

(7) Tillage and Irrigation—Anything that favors a rapid, succulent growth of the tree makes it more susceptible to blight. It is therefore most important that blighted orchards should have no more tillage and water during the first half of the growing season than are absolutely necessary to the making of the crop. Barnyard manure should be applied only to the more resistant varieties.

(8) Kill the Green-Apple Aphis—Observation and experience have convinced us that the winged adult of this insect is the most important carrier of the blight after the bees stop working in the flowers. Thorough spraying with tobacco extract for the green aphis should greatly reduce the spread of blight during the summer.

Preparing Fruit Exhibits

In a short time now an interesting part of the fruit grower's mail will consist of the premium lists issued by the various fair associations. A careful study of these will prove of value to all, but more especially to prospective exhibitors, as a thorough knowledge of the entry requirements and premium classes is necessary in making up a successful exhibit. Fruit fit to be taken to the fair must have been well grown. It is possible for a poorly cared-for orchard to produce a winning plate, but it is a rare thing, and, when it comes to the larger box classes, practically impossible. Well-grown fruit has been properly sprayed, cultivated, pruned, thinned and harvested. Too great emphasis is usually put on the matter of size by both the management of the fair and the entrant. The abnormal, whether it be an apple the size of a pumpkin or a five-legged calf, is of interest, but should never be made even an important feature and could well be left out entirely. Fruit for exhibit should be selected from a large quantity and in good daylight, should show the proper form, size and color for the variety, and the individuals should be uniform in the above characteristics. It should not be necessary to say that show fruit must be wholly free from injury or blemish of any kind, not even a limb rub or broken stem.

If the fair is placing emphasis on the commercial side of the fruit industry, pack becomes important and should have careful study, especially when the fruit is apples or pears. Proper packing presupposes correct grading, which should have been done in good light and with a large quantity of fruit at hand. It is the custom to give equal value to bulge, alignment, height of ends, compactness and attractiveness. In a commercial way, however, the amount of bulge and the compactness are more important than the other features. Most of the packed apples which win prizes have been put up by expert packers.

For the earlier shows the peaches, plums, grapes and other soft fruits should be made more important parts of the exhibits and the requirements of perfection for them more rigidly enforced. With them condition, including freedom from blemishes and the physical condition of the fruit, is of primary importance and must be carefully considered in choosing the show fruit. Oversize in this class is nearly always accompanied by defects of other kinds, and what the exhibit might gain for being quite large is likely to be lost because of split stone, cracked skin or similar defects. District displays are of value for advertising purposes and prove one of the most attractive features of many fairs. The whole district should join in preparing them, under the direction of a committee, and each contribute according to his ability.—R. J. Barnett, Pomologist, Washington Agricultural Experiment Station.

Time Table for Girls Who Practice Canning

THE housewife who desires to can fruits may make use of the following time table which the United States Department of Agriculture has issued for the girls who are members of its canning clubs. Before attempting to can, it is best to have a timepiece where it can be conveniently seen, for by keeping exact track of the minutes much better results may ordinarily be obtained than by "intuitive guessing." In the time table there is a column for each of four different portable canning outfits, and in each column are the number of minutes that various fruits and vegetables should be boiled in each particular outfit before they are properly prepared. Proper preparation means the complete sterilization by boiling so that the germ life which might cause the product to spoil will be absolutely killed.

Almost every housewife has a tin clothes boiler which she can easily convert into a convenient sterilizing vat in which to boil the products which she desires to can. The only things necessary are a tight-fitting cover and a false bootom. The false bottom is made of wire netting and is absolutely necessary in order to prevent the jars from coming into contact with the bottom of the boiler. If the jars come into contact with the bottom they will break during the boiling. To make these bottoms the housewife may take an ordinary No. 16 wire netting of half-inch mesh which is cut to fit the bottom of the boiler. If the netting is not available, thin pieces of wood will answer the purpose. A patent open-door steam cooker is even more convenient than a clothes boiler. Even if she has neither of these, the housewife need not hesitate to can, for a deep sauce pan or tin bucket tightly covered will answer the purpose.

In the following table there are three columns (Nos. II, III and IV) in which the times for boiling are given for three different types of commercial canning outfits which the housewife might profitably buy. These are great labor-saving devices and their prices range from $5 to $15. A book of instructions acccompanies each. The busy housewife who has one of these portable canners may do the work out of doors and is relieved from cleaning up the "muss" after each canning experience. Operators also have fresh air and the freedom necessary for good work instead of the heat and confinement of the kitchen. The water-seal outfit (No. II) is a combined hot water and steam canner with a self-sealed top which permits the products to be boiled at a temperature two degrees higher than the home-made outfit will. This means

that for many things the time of boiling is shortened. Corn, for instance, takes ony 180 minutes, where it takes 240 minutes in the home-made outfit. The third or fourth canning outfits (Nos. III and IV) may also be obtained from a reliable dealer. These depend entirely on steam rather than hot water for cooking the fruit or vegetables, and are called "steam-pressure cookers." The cooker with five pounds pressure (No. III) does the work in much quicker time than the water-seal outfit, and the cooker with a pressure of ten pounds or more (No. IV), in some instances, will accomplish the work in half the time needed for the five-pound-pressure cooker. For example, corn may be satisfactorily prepared in the five-pound-pressure cooker in sixty minutes and in the ten-pound-pressure cooker in forty minutes.

One valuable feature of these commercial portable canning outfits is that they may be handled by children as well as by older persons, and young girls who are trying to learn how to can may use them out of doors without interfering with the routine kitchen work. There is also a commercial portable hot-water bath outfit which may be purchased to take the place of the home-made outfit (No. I).

Select the outfit which seems to fit your needs best. If possible see it in operation before buying.

CANNING TIME-TABLE

[In "Size of Can" column, No. 2 and No. 3 are standard sizes, about equivalent to one pint and one quart, respectively.]

Products to be canned	Size of cans, No. 2, Pints. No. 3, Quarts.	I Home-made hot-water bath outfits, at 212°	II Water-seal outfits, at 214°	III Steam pressure cooker, 5 lbs. or more	IV Pres ure cooker, 10 lbs. or more
		Minutes	*Minutes*	*Minutes*	*Minutes*
Apples, whole or sliced, for pie filling..	3	15	15	12	6
Apricots	3	15	12	12	6
Asparagus and other greens	2 or 3	60	60	45	35
Apple cider	2 or 3	20	15	12	10
Beans, lima or string	2 or 3	90	60	60	30
Blackberries, dewberries	2 or 3	12	10	6	3
Cherries, peaches	2	15	12	10	5
Corn (without acids)	2	240	180	60	40
Grapes, pears, plums	2	15	15	10	6
Hominy	3	60	50	40	35
Huckleberries	2	10	8	6	3
Okra and tomatoes combined	2 or 3	50	50	40	30
Peas, beets, carrots, etc	2	60	60	45	35
Pineapple	2 or 3	30	25	10	10
Raspberries	2 or 3	15	12	8	5
Sauerkraut	3	50	50	40	25
Sweet potatoes	3	80	70	60	40
Strawberries	3	15	12	8	5
Tomatoes	2 or 3	22	20	10	6
Tomatoes and corn	2	80	70	60	40
Grape juice	2	15	15	10	5
Quince	3	30	25	15	10
Tomato juice	2	20	20	15	10
Pumpkin and squash	3	60	60	45	35
Fish, pork	2	200	200	120	60
Chicken, beef	3	250	240	180	40
Figs	3	30	20	10	5
Rhubarb	3	15	15	10	5

For altitudes of 4,000 feet or more above sea level add about 25% time to this schedule.

The Evolution of the Cider Industry

[Specially Contributed to "Better Fruit"]

INDUSTRIES which live and continue through many generations to be useful to man must pass through periods of evolution. These periods of evolution make for the industry the development which fits them for the conditions resultant of ever-changing time. Progress and conservation brings on these evolution periods. Conservative feeling has been foremost in the minds of prominent men for many years. The by-products of our mills formerly consigned to our scrap dumps are now being treated and much valuable material obtained therefrom. Forests at one time considered worthless only to be converted into a clearing are now being protected by the government. The same thing is true of our western land and of our mineral possessions. In the meat industry packers have gone so far as to conserve every part of the hog so that now there is "nothing left but the squeal." And lastly but not least, the farmer is cultivating fewer acres of land and producing more crops than ever before.

Neither has the apple grower been lax in adopting this conservation spirit. Apples which formerly rotted under the trees are now made into cider, and from cider into vinegar, jelly and boiled cider. The latter is used extensively in making apple butter and for culinary purposes. To the orchardist who is enthusiastic with this conservation spirit, the cider press especially should appeal. As a people, we Americans are still woefully wasteful, but we are learning. Some of us have bumped into the fact that it is not only our products that count but our by-products as well.

There are no statistics to tell us how many millions of dollars have gone to waste in rotten apples. They have been allowed to drop from the trees and rot on the ground by the billion bushels. Occasionally some farmer has had the foresight to open the orchard gate and let the hogs in. With the further exception of a few mills with which few farmers ground and pressed the apples into cider the loss was total. By the old process of cider making the apple juice was permitted to remain in contact with the air so long that it was very difficult to keep it sweet; with the improved methods we can have sweet cider, vinegar, jelly and apple butter for our New Year's dinner all made from the same load of apples.

The old log beam having a fulcrum at one end and raised by hand power was our primitive cider press. The pressure was obtained from the weight of the log, together with the weight of a man who was stationed at the other end of the log. Next in line came the screw and knuckle-joint presses, which served the apple grower long and faithfully. But these, too, came to the turn of the road and were supplanted by modern hydraulic presses. The old-style screw press of the small type is still used to some extent where it is desired to make a small amount of cider at odd times for private use. These presses will turn out from 40 to 100 gallons daily and are sold at prices ranging from $10 to $20.

The modern hydraulic press is equipped with a piston working in a cylinder. Water is easily pumped through a small pipe into the cylinder and the pressure being applied against the end of the piston or ram. The ram is thus forced out, pressing the apple pomace which has previously been prepared by a hand or belt-driven apple grater. An average of 4½ gallons of cider can be produced by these presses from a bushel of apples, and from 300 to 6,000 gallons made per day. The hydraulic press has put the cider industry on a paying basis. The price for making cider ranges from 1 to 3 cents per gallon; one day's run of 4,000 gallons, say at 2½ cents per gallon, would make the operator $100. Treated cider sells as a soft drink at 50 to 70 cents per gallon; 100 bushels of apples unfit for market could thus be made to yield between $200 and $300 with very little labor.

Some of the useful products which come from the apple are vinegar, cider syrup, cider jelly, apple butter, pasteurized cider, etc. Below is given a brief description of these products:

Vinegar—The process of transforming apple juice into good cider vinegar is easily accomplished and can be produced in every household where the necessary temperature can be controlled. For vinegar, the windfalls may be used or the pomace of later pressing may be repressed, but for a superior article only sound, ripe apples should be used. Common experience teaches that if cider is exposed to the air it will soon ferment. Now by proper handling after the first stage of fermentation the cider may be converted to vinegar in a very short time. It is well understood now that fermentation is the work of myriads of bacteria that infest the cider and behave very much after the manner of yeast in bread making. Cider, in changing to vinegar, passes through two stages: First, the sugar of the juice is changed to alcohol. Next, the alcohol is changed to acetic acid or vinegar by further fermentation.

Cider Syrup—Evaporation is another method of treating cider. By this process the volume is greatly reduced and the resultant product is so concentrated that it will remain in a perfect

state of preservation for years. In this way two great advantages are secured: First, the product can be stored in much less space, and, second, it will keep indefinitely. When the cider has been reduced in volume in the ratio of five gallons to one the product is of such consistency as to be suitable for handling and in no danger of fermenting. This product is called cider syrup, or boiled cider, and is widely used in making apple butter, mince pies and the various products of the culinary art.

Cider Jelly—When evaporation is carried further, reducing the volume in the ratio of about seven to one, the product is known as cider jelly. In this form it is quite acceptable to those who like a jelly somewhat tart. By adding sugar it may be made to please the taste of those who like jelly of a milder, sweeter taste. The jelly may be flavored to suit various tastes by using any flavoring material that will not evaporate readily. Apple jelly is usually marketed in glass jars holding two or three pints.

Apple Butter—One of the chief uses of cider syrup is in the making of apple butter. Everybody knows the "goodness" of apple butter. Fond memory will hark back to "bread, butter'n apple butter." This apple product, combining as it does the essentials of the best fruit known to man, well deserves high rank as a staple food and table delicacy. The slow, laborious method our mothers used—making apple butter in a big copper kettle—has given place to the new steam cooker. A copper coil quickly and easily converts a quantity of pared apples and cider syrup to a clearer, smoother and more delicious product than even mother was able to give us for our "piece." In the old method heat caramelized some of the sugar, which gave the butter a dark color and a burnt-sugar taste. By the use of the simple, inexpensive apple-butter cooker these objections are overcome.

Pasteurized Cider — Still another method of treating cider is the process known as pasteurization. Many attempts have been made to preserve cider sweet and pure, just as it comes from the press. The use of preservatives is very unsatisfactory and often dangerous. It is well known that a fruit juice can be preserved by heating it and sealing it up, but the chief difficulty in this is to heat to the proper temperature and at the same time exclude the air. A temperature of 160 degrees Fahrenheit is sufficient to destroy bacterial life and prevent fermentation, but a temperature higher than 170 degrees Fahrenheit will give to the cider a baked-apple taste, rendering it undesirable as a drink. A simple pasteurizer will perfectly sterilize, filter and seal up cider so that it will keep indefinitely and retain the same flavor that it had as it came from the press. The health-giving properties and the medicinal qualities of pure apple cider give rise to a popular demand for the product of a pasteurizer. Pasteurized cider retails at prices that net the cider maker a handsome profit.

Fundamental Principles of Co-operation in Agriculture

By G. Harold Powell, Manager California Fruit Growers' Exchange, Los Angeles, California

THIS discussion deals with some of the fundamental principles of co-operation as applied to business problems in American agriculture. By co-operation in the business of agriculture is meant that form of effort under which a number of farmers associate themselves together as members, create an incorporated agency called an association, a society or an exchange, or by other similar terms, through which the business of the members is transacted at cost. The operations of the corporation are conducted under the form of an industrial democracy for the benefit of the members. The members may share equally in the responsibility of the organization by having an equal voting power, though in some organizations the voting power is proportional to the amount of business each transacts through the association. The money received for a product which a member distributes or sells through the association is returned to him after the actual operating expenses are deducted, including possibly a charge for depreciation on the property, a reserve fund and the usual rate of interest on the capital used in the business; this interest being limited to a reasonable compensation for the use of the money. The things he buys are purchased at cost; either at the wholesale cost plus the overhead charge, or at the prevailing retail or competitive prices with a refund at the end of the year of the earnings or surplus pro rated on the volume of his business.

The co-operative organization differs fundamentally from the capital stock corporation conducted for profit. A capital stock corporation for profit is organized to return an earning and a profit on the capital used in the business. The basis of administration, control and the distribution of earnings is the capital invested in the undertaking. In a co-operative organization the basis of control is the membership, where each votes equally, irrespective of the volume of his business; though the basis of control is often made the product of the members, where each votes in proportion to the volume of business contributed, while the earnings in either case, if they occur, are returned to the member in proportion to the volume of business he transacts through the organization. The basis of the co-operative organization is men; of the capital stock corporation, money. Capital cannot co-operate; products cannot co-operate; only men can co-operate. When the degree of co-operation of a member is measured by the capital or the volume of business contributed, then the members as men are not co-operating; either capital or a product is the basis of co-operation, through the member as the medium.

There is much confusion in the use of the term "co-operation" as applied to agricultural efforts. It is commonly applied to any group of farmers who associate themselves together. They may organize as members of a voluntary unincorporated association of individuals, or as an incorporated capital stock association to handle farm crops for profit or for other purposes, or as nonprofit corporations without capital stock. In California, for example, the term is applied to both profit and nonprofit corporations organized to handle farm products, whether organized and controlled by the producers themselves or by others. In other parts of the country the same uncertain use of the term is applied to various kinds of agricultural movements. The term needs to be defined by the federal and state statutes. It is believed that its use as applied to business organizations in agriculture should be restricted to incorporated associations, societies, exchanges or agencies which are formed exclusively for the benefit of the members; whose voting power is based on equality of membership; whose membership is confined exclusively to active producers, the membership ceasing to exist when the producer withdraws from the organization, and whose earnings are distributed on the basis of the product, rather than on the capital contributed by each member, after a fair rate of interest is paid for the use of capital actually employed in the business, if any, and other overhead charges are deducted. A co-operative organization, therefore, is not a corporation in which the capital is contributed primarily in order that it may earn a profit; nor one composed of producers and nonproducers; nor one in which the producer's product is handled by a corporation for the benefit of the stockholders rather than the members; nor one in which the membership is not under the control of the organization; nor one in which the members do not actually control the organization. It is an association of farmers who unite in an effort to handle their common interests through an agency which is controlled by them, on the principle of an industrial democracy, and exclusively for their benefit.

A co-operative association may be incorporated as a capital stock corporation or as a nonprofit corporation without capital stock. If formed as a capital stock corporation it may still be legally co-operative if the laws under which it is formed permit the members to manage its affairs along co-operative lines, or if the statute provides the method of voting, the method of transferring stock, the limitation of membership and the distribution of earnings

according to co-operative principles. There has been little effort by the states to enact laws that will permit the organization of purely co-operative associations of farmers. It is therefore impossible in most states for an association to be formed that can operate securely along co-operative principles, though as a matter of fact many associations so formed do, by the consent of the stockholders, actually operate co-operatively.

The stock corporation as defined by the statutes of most states is not the form under which to incorporate a farmers' business organization, though most of the so-called co-operative associations have been incorporated under the stock corporation statutes. The stock corporation laws have been enacted primarily to meet the needs of capital, not primarily for the benefit of those who may use the facilities of the corporation. The membership in such organization is not under legal control, because the right to sell the stock is a legal incident of its ownership. A stock-

holder may sell his farm and continue to be a stockholder in a stock corporation and still have the right to examine the affairs of the association, or he may sell his stock to someone who is not interested in the organization, or who may even be antagonistic to it, or he may withdraw his membership and still remain a stockholder. There is no legal way by which the stock, and therefore the control of the corporation, can be confined to the membership after the stock has once been issued, unless the association is able to take over the stock and hold it as a trustee, until it can be resold to a member. Neither is the voting power of the stockholders under control in a stock corporation, because the voting power is generally proportional to the number of shares held by each stockholder.

As a matter of fact most of the so-called co-operative associations of the country have been incorporated as capital stock corporations in the absence of other statutes under which they could be incorporated, and many of them operate by mutual agreement expressed in the articles of incorporation or in the by-laws, on strictly co-operative principles; others vote in accordance with stock ownership, fix a maximum amount of stock to be owned by any member, and apportion the stock on the bearing acreage of the members, but make no profits on capital. These organizations usually provide that a withdrawing member shall offer his stock to the association before he can sell it outside, a provision that is useless if the association is not able to take it over.

They may provide also that all the earnings shall be returned to the members, pro-rated on the business transacted by each, after interest is paid on the capital invested and other overhead charges are deducted. The stockholders may vote equally by agreement and the capital invested may be paid only a fair rate of interest for its use. The difficulty in such organizations lies in the fact that some of the conditions to which they agree are not, in case of trouble, enforceable in the courts, and the organization ceases to be co-operative when the stockholders desire for any reason to exercise their legal privileges along non-co-operative lines.

As a result of organizing a so-called co-operative association under the usual stock corporation laws, many of these organizations often pass into the hands of nonproducers or of rival interests, following the withdrawal of members through the sale of farms and the sale and transfer of stock, or a partial control may be held by dissatisfied stockholders who have withdrawn as members.

In other states, especially in California, the statute provides for the incorporation, organization, management and co-operation of agricultural nonprofit associations which do not have capital stock and whose business is not carried on for profit. These associations issue certificates of membership to each member, but the membership cannot be transferred or assigned to any other person, nor is the purchaser of a property of a member entitled to membership by virtue of such purchase. In such associations the basis of voting and the control of the membership is subject to rules made by the association. These associations may accumulate a capital with which to transact business, though the capital is not in the form of a paid-in capital stock. It may be accumulated pro rata from the proceeds of the shipments of the members, or in any other way agreed to by the members.

In Nebraska co-operation has been defined and given a legal status. The law says, "for the purpose of this act, the words 'co-operative company, corporation, or association' are defined to mean a company, corporation or association which authorizes the distribution of its earnings, in part or wholly, on the basis of, or in proportion to, the amount of property bought from or sold to members, or of labor performed, or other service rendered to the corporation." It differs from the general incorporation law of Nebraska by providing that every co-operative corporation has the power "to regulate and limit the right of stockholders to transfer their stock; and to make by-laws for the management of its affairs; and to provide for the distribution of its earnings."

In Wisconsin a law was passed in 1911 (Chapter 368, Laws of 1911) which provides for the formation of "a co-operative association, society, company or exchange, for the purpose of conducting agricultural, dairy, mercantile, mining, manufacturing, or mechanical business on the co-operative plan." It "may buy, sell and deal in the product of any other co-operative company heretofore organized or hereafter organized" as a co-operative association. The law provides that "no stockholder in any such association shall own shares of a greater par value than one thousand dollars * * * or be entitled to more than one vote." It provides that the directors shall apportion the earnings, subject to revision by the association at any time, "by first paying dividends on the paid-up capital stock not exceeding six per cent per annum, then setting aside not less than ten per cent of the net profits for a reserve fund until an amount has been accumulated in said reserve fund equal to thirty per cent of the paid-up capital stock, and five per cent thereafter for an educational fund to be used in teaching co-operation, and the remainder of said net profits by uniform dividend upon the amount of purchases of shareholders and upon the wages and salaries of employes, and one-half of such uniform dividend to nonshareholders on the amount of their purchases, which may be credited to the account of such nonshareholders on account of capital stock of the association; but in productive associations such as creameries, canneries, elevators, factories and the like dividends shall be on raw material delivered instead of on goods purchased. In case the association is both a selling and a producing concern, the dividends may be on both raw material delivered and on goods purchased by the patrons." The law provides that no corporation or association doing business for profit shall be entitled to the use of the term "co-operative" as part of its corporate or business name unless it has complied with the provisions of the act.

One of the common difficulties in a so-called co-operative association formed as a stock corporation results from the payment of dividends on the paid-in

capital above a fair interest for the use of the capital, especially where the capital contributed by the members is not proportional to their individual shipments. The tendency in such organizations is to pay high dividends on the stock. The stockholders generally demand an unusual earning on the capital contributed. They acquire the dividend habit and deduct an amount from the proceeds from the fruit of all members, or from the earnings of the company, to pay the dividend, before returning the proceeds to the growers. In some fruit growers' organizations dividends of twenty, thirty, or even fifty per cent have been paid on the capital stock.

The difficulty over the payment of dividends usually arises with a member who is a small stockholder and at the same time a large shipper, or when a stockholder ceases to be an important shipper. A grower becomes dissatisfied when he realizes that the payment of a profit to capital, whether taken from the proceeds of his fruit or made as an earning on his purchases, are used to enrich a stockholder who has money invested in the corporation but who has not contributed to its success except in the original investment. Another source of trouble in the stock corporation is that the grower becomes dissatisfied after receiving a liberal dividend on his stock if the business condition of the organization does not warrant its continued payment. In the citrus industry these difficulties have usually been avoided by paying no dividend on the capital, or at least a dividend not in excess of the customary rate of interest.

A farmers' organization that has been organized under the usual stock corporation laws is on an uncertain foundation, not alone from the lack of control of the membership, but also because of the conflict between the capital and the product of the members whenever the proceeds derived from the latter are reduced to pay an unusual rate of interest on the capital contributed.

There are many so-called co-operative organizations (shrewdly formed) that make an earning for the corporation on the product of the grower by retaining the control of the facilities through which the growers' fruit is handled. The packing houses may be controlled by the organizers and a large dividend paid out of the proceeds of the product on the capital invested. The purchase of supplies may contribute a profit, low grade supplies may be sold at the price of high grade material, and profits may be made in many other indirect ways. An organization that pays a profit to capital from the growers' product, either for the use of packing facilities or for any other service, is not co-operative. It is a stock corporation, operating for the grower for profit on capital, while a co-operative organization is operated by the producers wholly for their own benefit, the benefits being pro rated on the use which the member makes of the organization.

A co-operative organization of farmers must be founded on economic necessity if it is to be permanently successful. The reason for its existence must lie in some vital service which it is expected to perform if it is to have strength enough to live in the face of the competition to which it will be instantly subjected. It must compete with existing organizations and this competition will be directed towards eliminating it; it will be viciously attacked; every conceivable form of misrepresentation will be leveled against it; the officers will be attacked by insidious rumors concerning their ability or integrity; the banks, especially in the newer sections, may be controlled by competitors, and may refuse to furnish the necessary credit; and every weapon known to competition, either legitimate or disreputable, will be used to put it out of business.

The average producer is not a business man, nor is he skilled in the arts of competitive business. He is naturally a strong individualist. He is slow to delegate authority over his affairs to anyone, and when he is face to face with the skillful arguments of those who aim to break the organization and keep him working as an individual, he is likely to weaken and finally leave the organization unless he had felt the effect of hard times, a helplessness on account of a combination of those who buy or sell his products, excessive freight or commission charges, or other forms of oppression. It is an historical fact that the investment of the farmer must have been threatened by existing conditions before he had been able, in the past, to overcome his individualism sufficiently to work with his neighbors in co-operative team work. The country is strewn with the wrecks of co-operative organizations that were born prematurely and which died by the wayside, because the farmer himself deserted in the first real conflict with the established agencies that have handled his business. Co-operation, to be successful, must be founded not only on economic necessity, but it must grow through gradual evolution. It must have a small beginning and grow in strength through experience step by step, rather than by leaps and bounds. The fundamental mistake that is being made in many localities is to form a farmers' organization all at once on a plan of an organization that has taken years to develop. The plan may be sound, but a co-operative organization

can only succeed when given the unflinching support of the members who through years of experience have acquired an appreciation of the fundamentals that underlie a successful association of this kind. The success of any organization depends on its members, not on its form.

The membership in a co-operative organization should be confined exclusively to those who are producers and who, as producers, use its facilities. The members should be acquainted and have confidence in each other. It should never include those who contribute capital alone to it. Many organizations are formed by bankers, fruit dealers, or others, who promote an organization for the purpose of making a profit from it. They may be formed in good faith by business men who realize the value of the co-operative movement and who are willing, as a service, and not for profit, to furnish the capital for its organization. The need for such an organization must spring from within, from the necessity of the industry, and not from a desire of a commission merchant or broker, or of an ambitious manager who sees an opportunity of capitalizing the co-operative movement for his personal benefit. There are many organizations of the latter type that masquerade under the co-operative banner, but which are formed, managed and controlled either directly or indirectly by those who make a profit on the packing organizations, on the sale of fruit, on the purchase of supplies, on railroad claims or trade rebates, or in other indirect ways. Such orgnaizations are always kept prominently before the growers as co-operative, a situation which, when it exists, is almost prima facia evidence that the co-operative features are for the benefit of a few, rather than for all the members.

Membership in a co-operative organization should carry with it a responsibility on the part of the member strong enough to carry it through adversity of every kind. To feel this responsibility, the member must of course feel the neeessity for the organization; he must feel that he is a part of it; that the organization is his, developed and managed to promote and protect his interests. If the association is formed by the members to meet their economic needs, this feeling of responsibility pervades the membership, but if the association is formed to promote the welfare of the officers or any other class of people, or if financed by well-meaning people who really desire its success, an association cannot depend on the loyalty of its members in time of adversity.

One of the problems that a co-operative association always has before it is keeping alive the interest of the members. They must be a vital part of the organization. They must take an active part in its development. They must keep posted on the details of the business; the business methods of the organization must be an open book to them. There can be nothing mysterious about the management of the business. Contracts, salaries, trade or other legitimate rebates, railroad claims, profits or earnings of every kind—these must be of such a nature that every grower can know about them if a co-operative association is to maintain the loyal support and confidence of its members. It must, of course, win that support by the results it accomplishes, and these results must be obtained by a business record that keeps free from suspicion regarding the integrity of its methods, and as free as possible from criticism regarding its business efficiency. Every defect of the organization will be kept before the members by its competitors, and imaginary defects created by willful misrepresentation by those who aim to break down the membership will always be prominently featured.

In a strictly co-operative organization a fundamental principle should be "one man, one vote." It should be a real industrial democracy in which the members trust each other and lean upon each other's judgment as men. In such an organization neither the capital contributed nor the volume of business transacted should be the basis of the responsibility or influence of the individual member, because neither can co-operate or be made a basis for lasting co-operation. In the European co-operative associations the "one man, one vote" principle is applied as a test to separate the strictly co-operative associations from the pseudo co-opertive. Since co-operation is founded on men, not on capital or products, there is no fundamental difference in principle where capital is eliminated and product is substituted as a basis of voting and control. The control of a co-operative association should be founded on the equality of membership, whether the member contributes a large or a small volume of business. It is the members, who as men, co-operate in these organizations. The history of the co-operative movement in Europe and in California shows that this fundamental basis is sound. In the latter state one organization, the California Fruit Growers' Exchange, which was formed as a stock corporation but which operates strictly on co-operative principles handles a business of twenty million dollars, more or less, annually on the "one man, one vote" principle of voting. The directors each represent a business that varies widely in volume and in value, but the "one man, one vote" principle of representation has stood the test of business experience and has been one of the foundation stones on which the success of this organization has been built. The directors reserved the right when they organized to vote pro rata on the shipments represented by them, but this method of voting has never been used in twenty years of business experience. The California statute governing the non-profit corporations without capital stock permits the voting power of members to be equal or unequal. In many of these organizations the voting power and property rights of the members is proportional to the contribution which each makes to the investment necessary for operation, the by-laws in some citrus fruit organizations providing that "members will contribute to the invesment neces-

Continued on page 22

BASIC PRINCIPLES

A marketing organization, like an individual, should have "a reason for the faith within" it. The 8,310 growers affiliated with the North Pacific Fruit Distribntors do have reasons for the faith within them. The basic or fundamental (and, as we believe, sound "horse sense") business principles that they are earnestly and intelligently working towards in the marketing of their fruit are:

FIRST—That the growers, through their own duly elected representatives, shall make the price on their own products.

SECOND—That the growers shall sell their own fruit through their own salaried representatives in the Eastern markets.

THIRD—That the growers shall finance themselves through their own Northwestern banks rather than by mortgaging their fruit to an Eastern buyer and thereby to that buyer's one market.

FOURTH—That the growers shall provide their own Northwestern storage in order to avoid mortgaging their fruit to an Eastern storage concern and thereby to that storage concern's tributary market.

FIFTH—That the growers shall receive from their own representatives complete information on markets, prices, crops, etc., as well as a complete account sales, etc., of their own business affairs through regular daily bulletins and reports.

SIXTH—That the growers shall increase their trade connections through having an all-districts organization through which they can sell to any buyer, any quantity of fruit, of any variety, of any grade, from any district, with a gnarantee of quality and uniformity.

SEVENTH—That they shall manage their own affairs through their own fruit-grower-representatives chosen by the growers and accountable only to the growers.

Does the shipping organization that represents the grower not affiliated with the North Pacific Fruit Distributors do these things for its growers?

Are not these basic, "horse sense," business principles? Should not the fruit grower handle his own business just as every other trade or profession handles its own business?

North Pacific Fruit Distributors

A Co-operative Central Selling Agency for 115 Local Fruit Growers' Associations

Spokane, Washington

BETTER FRUIT

HOOD RIVER, OREGON

Official Organ of The Northwest Fruit Growers' Association

A Monthly Illustrated Magazine Published in the Interest of Modern Fruit Growing and Marketing

All Communications Should Be Addressed and Remittances Made Payable to

Better Fruit Publishing Company

E. H. SHEPARD, Editor and Publisher
H. E. VAN DEMAN, Contributing Editor

STATE ASSOCIATE EDITORS

OREGON
C. I. Lewis, Horticulturist.....Corvallis
H. S. Jackson, Pathologist.....Corvallis
H. F. Wilson, Entomologist.....Corvallis

WASHINGTON
A. L. Melander, Entomologist.....Pullman
O. M. Morris, Horticulturist.....Pullman

COLORADO
C. P. Gillette, Director and Entomologist.....Fort Collins
E. B. House, Chief of Department of Civil and Irrigation Engineering, State Agricultural College.....Fort Collins
E. P. Taylor, Horticulturist.....Grand Junction

IDAHO
W. H. Wicks, Horticulturist.....Moscow
W. S. Thornber, Horticulturist.....Lewiston

UTAH
Dr. E. D. Ball, Director and Entomologist.....Logan
Leon D. Batchelor, Horticulturist.....Logan

MONTANA
O. B. Whipple, Horticulturist.....Bozeman

CALIFORNIA
C. W. Woodworth, Entomologist.....Berkeley
W. H. Volck, Entomologist.....Watsonville

BRITISH COLUMBIA
R. M. Winslow, Provincial Horticulturist.....Victoria

SUBSCRIPTION PRICE:
In the United States, $1.00 per year in advance
Canada and foreign, including postage, $1.50

ADVERTISING RATES ON APPLICATION

Entered as second-class matter December 27, 1906, at the Postoffice at Hood River, Oregon, under Act of Congress of March 3, 1879.

The War.—During the first sixty days of the war much uncertainty prevailed in business. Our imports have decreased; our exports have decreased. It is generally more or less believed that this is temporary. It is hoped in the near future business conditions will become normal. At present the condition is such as to require deliberate judgment and conservative methods in all lines of business. The crops in America this year are large. If these crops can be handled in an intelligent business way and if transportation on the sea continues open and sufficient transportation facilities are secured the crops of the United States can be moved to good advantage with a fair profit to all. We, as fruit growers, at the present time are directly interested in how the war will affect the market price of apples during the coming winter. Few assume to be very definite in their expressions of prices. The prices obtained this year will in a large measure depend upon the judgment and ability with which the apple crop is handled. It seems wise to suggest to the growers, first, that every expense connected with harvesting and marketing the apple crop should be done at a minimum. Economy in every feature of the business should be our watchword. Second, extreme care should be exercised not only by the grower but by the packer and shipper in seeing that the apples are packed and graded strictly in accordance with the rules. It is a year when only good stuff should be packed, a year when everything in the nature of a cull should without a single exception be sent to the vinegar factory. Third, it seems wise to call the growers' attention to the fact that the best results will be achieved by able, intelligent and wise marketing. Fourth, it is a year when every grower should select for his marketing concern one that has ability; one that is absolutely straightforward in business; one that has his confidence and is entitled to it to the fullest extent. If the grower will carefully follow these suggestions and act in good business judgment, then he can reasonably expect a fair price, which will pay a reasonable profit on the investment and for his year's work. Only the best results can be secured by such procedure and by such procedure there is a reasonable certainty, but by haphazard methods the only thing certain would be uncertainty.

Mr. H. C. Sampson.—It is announced that Mr. H. C. Sampson, secretary of the North Pacific Fruit Distributors, has resigned his position to engage in business for himself. Mr. Sampson was one of those who took an exceedingly active interest in the organization of the North Pacific Fruit Distributors and it may be truthfully said that no one connected with the association has worked harder or more earnestly for its success. He is certainly entitled to his share of credit for the organizing of the North Pacific Fruit Distributors. Mr. Sampson in his official capacity has visited and addressed the fruit growers of practically every fruit growing section in the Northwestern territory. Wherever he has gone he has invariably created a splendid impression. Mr. Sampson commands the good will and confidence of the growers throughout the Northwest, and we honestly believe all those who are associated with the Distributors will sincerely regret his retirement. Mr. Sampson enters his new field of work with the best wishes of all connected with the fruit industry of the Northwest.

The European War.—War means loss of life, loss of property, loss of business and devastation, in accordance with the magnitude, the number of people engaged in the war and its duration. Every nation engaged in the war suffers severely in every one of the particulars above referred to. The feeling in the United States over this war is one of sincere regret. America is universal in the hope that this war will be quickly and decisively settled, for the all-important reason that the quicker the war is over the less the loss will be in every respect. The present European war is so extensive that already the nations engaged have several million men actively engaged in warfare. It is to be regretted, nevertheless it is a fact, that the producing capacity of each one of these nations will be largely reduced, both in foodstuffs and other commodities, consequently there is a duty which the United States should assume, and that duty is to bend its energies to produce all of the necessities of life, so as to be in a position to furnish these nations, which will become depleted, with necessary supplies. In addition the United States has another role to play, which is equally important, if not more so. It is the only one of the big powers not engaged in the present war, therefore the United States should follow the wise suggestion made by President Wilson in remaining neutral, not only in action, but in expression of public opinion, always holding itself in readiness so that at the earliest opportunity it will be in position to extend its services as peace-maker to be acceptable as such to the nations engaged in war. The United States must remain mentally free from prejudice and keep itself in a frame of mind to render justice in its advice to all nations engaged.

1914 Apple Crop Estimates.—It seems to be an invariable custom with everyone connected with the apple business to furnish estimates each year during the blooming season. The judgment of this is being questioned by many on account of the false impression which it invariably creates. It is a well known fact that an apple orchard may blossom profusely and still produce very little fruit. It is a fact that only one or two apples at the most in a cluster of eight or ten blossoms will make marketable apples. Every blossoming season is usually followed by a very heavy shedding, and even after this comes a dropping after the apples are formed.

This year the estimate went out unusually heavy and many are still maintaining that the crop will equal the blossom estimate. In other words, it is always extremely difficult to correct the first impression, even though it be erroneous. Early in the season the estimates from the Northwest in carloads were placed by some as high as 25,000 cars. Later they were reduced to about 15,000 cars, and at present it is claimed by some of those connected with the large organizations that the Northwest will not ship more than nine or ten thousand cars. A very recent estimate published in the newspapers gave Colorado something like 7,000 cars. On good authority we understand Colorado does not expect over 1,500 cars. A recent estimate put Oregon down for about 5,500 cars. The writer, who is very conversant with Oregon conditions, does not believe the crop of marketable apples in Oregon will exceed 2,500 cars for the year 1914. Without question the unsettled marketing conditions existing at the present time will result in high class grading rules being adhered to very strictly, which will mean that only the best quality will be packed and shipped to market, the balance going to the canneries, evaporators and vinegar plants. This will be a large factor in reducing the quantity to go on the market.

The Woolly Aphid of the Apple

The woolly aphid is one of the most insidious and dangerous of apple pests. It occurs on the roots and above ground, also on the branches. The branch form can be easily controlled by contact insecticides, but it is practically impossible to stamp out the aphids on the roots. Winter weather of Eastern Washington is usually severe enough to destroy

what individuals are above ground, so that developing colonies in the spring come from wingless aphids of the roots or crown. These aphids are apt to locate on a bruise on the bark and soon become conspicuous because of a growth of "wool." Their feeding poisons the tree and results in a local swelling and ultimately in a weak tree with small sized fruit. After a couple of generations some winged individuals appear, which migrate to other apple trees, thus spreading the pest. The summer generations are less vigorous, and in early fall other winged migrating individuals are produced. These rarely seek apple trees, but are attracted to elms, if near by, and there give birth to wingless sexual aphids, the females of which produce a single egg, which is laid for the winter deep in a crack of the bark. The following spring the insect inhabits the leaves of the elm, forming rosettes of curled leaves. Its third generation is the winged spring migrant that returns to the apple tree.

The woolly aphid is prevalent on nursery stock, and thus gets access to a new region. Apple stock showing swellings or galls should not be planted, and elm stock should be carefully searched for black eggs. When the woolly aphid occurs above ground it can be destroyed by a light swabbing of alcohol, gasoline or kerosene, or if numerous by a spraying of tobacco-soap, such as is given for green aphis. The underground form cannot be effectively reached and is consequently most dangerous. Kerosene emulsion, lime-sulphur or an abundance of tobacco dust applied to the roots have been recommended, but give only partial benefit. Plowing and cultivation to force the roots down are thought to be helpful, since the aphids do not thrive much below a foot. Northern Spy trees are remarkably free from attack, and such stock would prove valuable in a badly infested district. The woolly aphid is too delicate and weak to force its way through the soil, but it will work along cracks and roots and thus spread through the orchard or nursery row. To prevent branch infection from below, the trunk may be banded with equal parts of rosin and castor oil melted together and applied on burlap or cotton strips, or if in a dusty district where this method would be inapplicable, it has been suggested to pack around the trunk of the tree a good layer of sand, through which the aphids cannot crawl.—A. L. Melander, Entomologist, Washington State Experiment Station, Pullman.

Crude Oil Emulsion for Winter Spraying

In reply to numerous inquiries received at the State Experiment Station, Professor A. L. Melander has prepared the following statement: In those districts of the state where sulphur-lime has failed to give satisfactory results as a winter spray against scale insects, aphis, red spider and the like, it may be advisable to give a trial of crude oil emulsion. Although these emulsions have not been tried for many years on the Pacific Coast, yet where they have been used they have given excellent results. The oil spray covers the tree better than sulphur-lime does, so that it does not require so much to complete the spraying. It penetrates into cracks and crevices and, since it is not watery like sulphur-lime, it wets the eggs and bodies of the insects.

In the preparation of crude oil emulsion, California crude oil, which has an asphalt base, should be used. The emulsion is made by dissolving twenty pounds of fish oil (or whale oil) soap in twenty-five gallons of hot water. Four pounds of 98% lye is then dissolved in a couple of gallons of water, added to the soap, and enough water run in to make the full amount up to 177 gallons. This mixture, in the spray tank, requires an efficient agitator, of the propeller kind, to emulsify the oil. The agitator is started running, and when at full speed the oil is slowly poured into the tank. Twenty gallons of the crude oil complete the formula, and when this has been churned to an emulsion the spray is ready for use. After the oil has been added nothing else must be put into the tank, or some

of the oil might separate and thus make the spray dangerous to use.

There are several ready-made soluble oils on the market, in which the oil has been combined with the alkali and soap so as to be ready for use by simply adding water. There are also prepared soaps that need merely the addition of the oil and water to make the complete spray; but in any case a good agitator will produce a finer emulsion than merely stirring in the oil and water.

Critical experiments conducted last spring showed the great value of the oil spray, killing the scale almost immediately, where the suulphur-lime failed to show any practical effects for weeks after the application. However, in districts of Washington the standard lime-sulphur still is proving satisfactory, as it quickly kills the scales, and in such places there is no object as yet to be radical in changing the methods of insect control.—Washington State Experiment Station Bulletin.

Alfalfa in the Orchard—Silage

By W. S. Thornber, Lewiston, Idaho

THE seeding of orchards to alfalfa has in the past been regarded by most orchardists as a hazardous risk for the best good of the orchard in the future. However, later and more thorough investigations reveal striking advantages in favor of alfalfa in orchards under certain definite conditions. In fact, many examples are now on record that go to prove without a doubt that profitable returns may be realized from alfalfa as an intercrop or mulch crop in the orchard. An analysis of the benefits of alfalfa in orchards shows a three-fold advantage to this method for orchard tillage. A brief summary is as follows:

1. For the good of the soil: (a) By adding nitrogen and humus; (b) By making more plant food available; (c) By loosening hard subsoils; (d) Increasing water-holding capacity; (e) As a soil cover during hot, dry parts of the season.

2. Alfalfa directly benefits the tree: (a) Prevents rampant, excessive wood formation; (b) By checking the wood growth increases permanent as well as early fruitage; (c) Prevents winter injury by causing early maturity; (d) Increases the color and quality of most orchard fruits; (e) In pear orchards is recognized as one of the approved methods of combatting pear blight; (f) In apple orchards is the most satisfactory remedy known for rosette, little leaf or winter dessication.

3. Alfalfa in the orchard may be made a source of income: (a) By compelling earlier and better fruitage; (b) By producing from two to eight tons of marketable or usable hay per acre.

Just as alfalfa in the orchard may become highly beneficial as well as financially profitable, there is danger of it becoming very detrimental to the permanent good of the orchard. Examples of this kind are frequently found where alfalfa is sown among very young trees or too close to trees that are not especially vigorous. Another danger is sometimes seen in over-irrigated orchards, especially where large quantities of water are applied for the benefit of the alfalfa regardless of the welfare of the trees. Under no circumstances should alfalfa be sown in non-irrigated orchards unless the soil is extremely well sub-irrigated.

Silage bears the same relation to hay and dry fodder as canned vegetables do to dried ones. It is juicy, tender, and is relished by stock. The acids of silage help to keep the digestive tract in a healthy condition, and also act as an appetizer. In winter silage furnishes a green feed; in summer it saves the pasture and affords feed during a dry season. It is a roughage, and lacking in protein, and hence should be fed with some ground grain, alfalfa meal, cotton seed meal, oil cake or some concentrate. Silage is kept in the silo much as fruit is kept by canning. Bacteria can live only if they have a supply of air. The fresh silage ferments for a few days until the air contained in the interspaces is exhausted. If the silo is tight so that no more air can enter, there is no further fermentation, and the silage will keep in this condition indefinitely. Tests have proven that if it has been kept airtight, silage several years old is as palatable and nutritious as that put in the current year.

In building the silo the points to be observed are that it shall keep the moisture in and the air out, and be strong enough to withstand the pressure from the silage as it settles. The bottom and sides must be smooth and perpendicular, so the silage will settle evenly. If there are projections, or if the walls are not absolutely straight, the silage will settle unevenly, leaving air pockets around which there will be some spoiled silage. The round or cylindrical silo is the best form, as it has less wall space, hence less silage surface to guard against spoilage. Round silos are more easily filled, as it is impossible to pack silage into square corners.

The following table gives the amount of daily ration of silage required for wintering and fattening cattle, feeding dairy cattle, and for sheep:

	Pounds
Wintering calves, 8 months old	15 to 25
Wintering breeding cows	30 to 50
Fattening beef cattle, 18-22 months old—	
First stage of fattening	20 to 30
Latter stage of fattening	12 to 20
Feeding dairy cattle	30 to 50
Wintering breeding sheep	3 to 5
Fattening lambs	2 to 3
Fattening sheep	3 to 4

Winter Pruning of Fruit Trees

The average farmer and fruit grower has very little conception of the proper pruning of fruit trees. It is generally done at any time during the winter season when the tree is dormant. If no time is at hand it is delayed for another year. This system of pruning is disastrous. The fruit trees should be regularly pruned, regardless of the amount of pruning required. If pruning is done

every year the tree will get into the habit of producing a certain amount of wood and fruit, and there is little occasion for severe pruning. If the pruning during the first three or four years of an orchard after planting is properly performed, there will subsequently be little need for removing large branches. The pruning will then consist merely of the removal of superfluous shoots or branches that interlace, and this kind of pruning does not upset or disturb the growth and fruiting habits of the tree. Winter pruning should be delayed until March or until after cold weather has passed. Pruning during December and January is often disastrous in Eastern Colorado, as the wounds are apt to crack from the cold and thus make lodging places for diseases. Further, the wounds made at this time will not heal over so rapidly, while if pruning is done late in the season the wound will not crack and will heal over as soon as growth starts. If the removal of large branches is necessary, the wounds should be painted, using common thick white paint. Severe pruning in the winter also tends to increase and encourage the growth of water sprouts. —E. P. Sandsten, Colorado Agricultural College, Fort Collins.

Fall Treatment of Grasshoppers

The past summer has been unusually free from ravages by grasshoppers, but that is no guarantee that there will be no damage next year. The wise farmer will use the fall and winter months to put in practice methods of control. The only way to treat the grasshopper during the winter is to plow the ground where the pods and eggs are deposited to a depth of three or four inches. Generally the eggs are more abundant in some localities than others. This is very apt to be true regarding sod places along fences and ditch banks. With a spade in hand the farmer may investigate the various localities where eggs are apt to be found and discover their presence by examining the ground to the depth of two inches. After such a survey he will know whether certain sections need treating or not. It has been found at the agricultural college that if the eggs are exposed to the weather during the fall and also winter the greater proportion of them will be killed by birds and unfavorable climatic conditions.—S. Arthur Johnson, Colorado Agricultural College, Fort Collins.

Pruning for More Fruit at Less Cost

The purpose of pruning is to get more fruit and better fruit at less cost per box, said Professor V. R. Gardner of the Oregon Agricultural College, in addressing an apple growers' association. The shaping of trees is done by training; and we prune to modify fruit habits and control the amount and quality of the fruit. We can control this fruiting habit of trees only as we control the machinery for fruit production. The fruit spurs are the mechanism that the tree usually employs in its work of fruit-bearing. And pruning is generally regarded as the practice through which we directly influence fruit spurs. All fruit growers know that we can prune them out and reduce their number. Many believe that we can stimulate their formation and vigor by certain pruning practices. These beliefs are founded upon careful observation and experience.

Statement of the Ownership, Management, Circulation, Etc. of "Better Fruit," Published Monthly at Hood River, Oregon

Required by the Act of August 24, 1912.

Note: This statement is to be made in duplicate, both copies to be delivered by the publisher to the postmaster, who will send one copy to the Third Assistant Postmaster General (Division of Classification), Washington, D. C., and retain the other in the files of the post office.

Editor, E. H. Shepard. Post office address, Hood River, Oregon.

Managing Editor, E. H. Shepard.

Business Manager, E. H. Shepard.

Publisher, Better Fruit Publishing Company; E. H. Shepard, sole owner and publisher. Post office address, Hood River, Oregon.

Owners: (If a corporation, give names and addresses of stockholders holding one per cent or more of total amount of stock.) E. H. Shepard, sole owner.

Known bondholders, mortgagees, and other security holders, holding one per cent or more of total amount of bonds, mortgages or other securities: None.

Average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the six months preceding the date of this statement: (This information is required from daily newspapers only.)

E. H. SHEPARD, Editor and Publisher.

Sworn to and subscribed before me this 5th day of October, 1914.

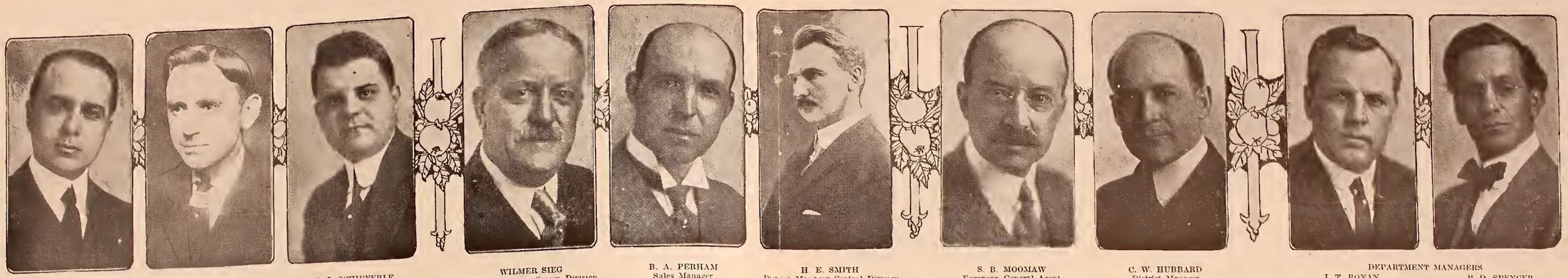
(Seal) ERNEST C. SMITH, Notary Public for Oregon.

My commission expires August, 1916.

Nitrate of Soda on Old Meadows

On an old meadow which has not been properly fertilized a top dressing of nitrate of soda is almost certain to show very marked results. The farmer is likely to be so enthusiastic over the showing made that he at once concludes that nitrogen is the one factor needed to make his hay crop a profitable one. Right here lies the danger. While the first application of nitrate of soda may show these marked results, it is not by any means safe to conclude that nitrogen is the only element of fertility needed. Repeated applications of nitrate of soda may soon result in no apparent benefit, and even result in a final condition worse than the original condition. The first application of nitrate of soda shows such marked results because there is a marked deficiency of nitrogen in the soil; but there is sufficient of the other fertilizing elements, particularly phosphorus and potassium, to balance the nitrogen used. The increased crop yields from the use of nitrate of soda make an increased drain upon the available phosphorus and potassium of the soil. No effort being made to replace these elements thus removed, the time very soon comes when no response is received from the application of nitrate of soda, because the phosphoric acid and potash have been depleted, or, in other words, are the limiting factors. As a rule, where nitrate of soda is used as a fertilizer it is a safe principle to use in connection with it some form of phosphorus and potassium, having in mind permanent results rather than a temporary increase due to the nitrate of soda.

Marketing Machinery of the North Pacific Fruit Distributors — Some of the Sales Staff



L. J. BLOT
District Manager
Minneapolis

M. W. MUMFORD
District Manager
Butte

H. J. SCHIFFERLE
District Manager, Omaha
Later, City Sales, Chicago

WILMER SIEG
District Manager Oregon Division
Portland

B. A. PERHAM
Sales Manager
Spokane

H. E. SMITH
District Manager Central Division
Chicago

S. B. MOOMAW
European General Agent
London

C. W. HUBBARD
District Manager
Regina, Canada

DEPARTMENT MANAGERS
J. T. RONAN
Traffic Manager and Claim Agent

P. D. SPENCER
Auditor

Fundamental Principles, Etc.

Continued from page 16

sary for operation in true proportion that the number of bearing acres of citrus orchard owned or controlled by each member respectively bears to the whole number of bearing acres for which citrus fruits are delivered or engaged to be delivered to the association any time during the year such memberships are issued." Even with such a provision in the by-laws, the "one man, one vote" principle is generally used in voting on the business operations of the organization.

There is a strong sentiment against the "one man, one vote" principle of voting when first presented to the average grower. The large grower fears control by smaller interests; the small land holders, domination by their larger neighbors. The history of the co-operative movement, both in Europe and in the United States, shows clearly that this adverse sentiment is a prejudice rather than an actual weakness in practical operation. Equality of membership strengthens the desire to co-operate, and men work together in business harmony just as they now do in the equal control of churches, schools and in governmental responsibilities.

A co-operative organization to be successful must be held together by a membership agreement or contract binding the members together for business purposes. In no other way can an association attain that degree of stability that is necessary in a business undertaking. The association must know definitely what it is expected to do, the volume of business to be handled, the expenses to be incurred and the preparation necessary to be made to transact its affairs in an orderly, economical manner.

Voluntary membership is usually suicidal in a co-operative association. In the last analysis the association can only succeed when the average member believes that the co-operative principle is sound; and that conviction must be strong enough to hold the members together when their opponents attack them insidiously and persistently. This faith must be founded on the sound business results of the organization, as well as on its larger influence on the development of the industry as a whole. Unless the benefits of the organization are large enough to keep the organization intact, the members cannot be held together indefinitely by any form of contract; but the human nature of the average farmer has not evolved to that ideal point when a temporary advantage offered him by an opponent may not blind him to the permanent advantages of the association to which he belongs. A membership agreement is a steadying influence on a grower who might be led astray by misrepresentation or by temporary dissatisfaction. Then, too, there are large numbers of farmers who are opportunists. They have no interest in the industry as a whole. They are interested only in their own immediate success. In handling their crops they are rampant speculators. They follow a sharp-shooting marketing policy, trying to hit the high spots presented by an association, a buyer or a commission merchant and giving but lukewarm allegiance to any individual or association. The opponents of the co-operative system understand this psychological trait perfectly, and unless the producer has formally bound himself to his association by a definite contract to handle all his produce through it for a given period of time they draw heavily from the membership by promising a larger return, or by playing upon his prejudices in other ways. It is an historical fact that a large proportion of the troubles and failures in the co-operative movement have been due to the irresponsibility of the membership whenever an association has been subjected to fire; and no one not experienced in the movement can have any conception of the degree to which misrepresentation, insinuation and other forms of creating disaffection are persistently kept before the co-operative producers by those who make an abnormal profit when his product can be handled individually. The same kind of misrepresentation is used in building up one association as against another when those who handle the business of a co-operative association are interested in profits, or derive their compensation from the volume of business handled.

The success of a co-operative organization depends primarily on the loyalty and stability of the membership; it depends further on efficiency in management. Efficiency in management cannot exist without stability of membership; nor can it be developed unless the members appreciate the necessity of providing an efficient management. The difficulty in most co-operative organizations is the lack of appreciation of the need of a high order of organizing and business ability on the part of the employes of the association. The common failure of co-operative associations is usually attributed to inefficient management; as a matter of fact it is due to the membership itself which has fallen short in securing skillful employes. The individual producer is likely to gauge the requirements of management by the size of his own business. He falls short in his estimate when he acts on a board of directors and is charged with the responsibity of providing a management to handle successfully a collective business. Inefficient management is a measure of the degree of business efficiency of those who are charged with the direction of the affairs of the association; and unless the membership will sustain a board of directors in employing men of a high order of ability a co-operative association is short-lived.

The management of a co-operative organization is more difficult than an ordinary corporation. The stockholders, not being experts in the affairs of the latter, do not often take an active interest in its details. The producer, on the other hand, is vitally interested in his own business and he is likely to take an active part, at least in giving advice concerning the conduct of the business. This is one of the most valuable assets in a co-operative organization if the manager is big enough to utilize it. Through the knowledge of the producer in the affairs of his association his interest and sympathy can be kept vital. If the management becomes autocratic, the interest of the member dies; if he is not big enough to work out a broad, progressive business policy, using such suggestions as are made by the producers in addition to his own knowledge and experience and the experience of his associates, he in turn loses his position. A management must possess tact, constructive ability, foresightedness, fearlessness in the conduct of the business and a clear conception of the real underlying purpose of the organization, if it is to succeed. The integrity of the management must be beyond reproach; it must be free from entangling business alliances; it must be free from the participation in any secret profits arising directly or indirectly from handling the business of the organization; in short, the dealings of the management with the organization must be an open book, free from questionable business practices of every kind. The influence of the management, next to the loyalty of the members, exceeds all other influences and the success of a co-operative association depends on their working out in mutual confidence an efficient business system that is able to meet successfully all conditions as they arise.

A co-operative organization must be founded on a special crop and the loyalty in which it handles the product must be comparatively restricted. Special industries involve common problems to be solved by the producers, similar difficulties to overcome, similar trade practices and similar trade connections. The members of an organizathat is formed to handle fruit, vegetables, poultry and general farm crops have no common ground to stand on, and these general associations have not been successful up to the present time because the membership cannot be held together. The citrus fruitgrowers of California are all interested in increasing consumption, in extending markets, in reducing the cost of distribution and marketing, in securing reasonable transportation costs, and in the same public policy questions that affect the industry. They have therefore developed a vitality in their organizations that has been attained in no other agricultural industry in America. An organization founded on different crops, on the other hand, has a series of totally different problems to meet at one time, different business connections to form and different classes rather than one class of opponents to meet.

To be successful a co-operative association must sustain and develop the individuality and initiative of the different localities in which it operates. The units of the organization must therefore apply to a locality in which the soils, the climate and other conditions produce a similar grade of product. If the products vary widely in color, texture, form or in other character, on account of the conditions under which they are grown, the producers cannot be held together because the grades cannot be made similar. The attempt to have a single organization cover a wide territory is therefore likely to fail. No amalgamation of the farmers of different localities in a common organization has ever been successful. On the other hand, the orange growers of one locality, or of similar parts of a locality which produce similar grades of fruit, may organize to prepare their products for market under distinct local brands. Those of another may do the same thing, and a large number of local units may be formed as long as the unit embraces a produce of similar grade and character. Then as a matter of economy and efficiency these local units may federate and create a central agency through which they handle their common problems. But each local unit preserves its local character and develops its local pride and reputation by selling its product under a brand that is the exclusive property of the local association. In addition to its local brand it may also add a brand of the central agency in order to give it greater selling power in all parts of the country; but no local unit should use the brand of a central agency exclusively without using its own brand at the same time.

The outcome of a co-operative organization formed to handle the growers' product will succeed or fall on the skill and integrity with which the product is harvested, handled, graded and packed. The limits of this discussion will not permit this part of the subject to be handled in detail. A few fundamental principles, however, can be stated:

1. In the average association, the individual grower does not possess sufficient skill to harvest, handle, grade or pack his product carefully, uniformly or attractively enough to permit the association to establish a standard of quality, and therefore acquire a reputation for its brands or grades. A uniform standard of quality in the brands shipped by an association is fundamental to success. This seems like a self-evident axiom, but the fact is that this is the rock on which many co-operative organizations have been dashed to destruction. Poor handling in harvesting, improper handling in preparing the product for sale, careless or dishonest grading, or lack of skill and knowledge in grading and packing,—these are common rather than unusual conditions in the product of many co-operative associations where the handling of the product is controlled by the individual members. The output of an association, therefore,

acquires no stable merchandizing value. The brands are not a guarantee of quality.

2. A reputation for uniformity in grading and packing can only be acquired when the product of all of the members is handled under uniform conditions. The standardization of a product can result only from standardizing its handling, grading and packing.

3. A uniform product can be established by having the product of the individual members handled by the members, under the supervision of the association, or for the members by the association. The former method is employed successfully in some deciduous fruit associations; the latter is the usual method in the citrus fruit associations. The conditions which lead to either method is a local as well as an industry question. In the citrus industry the crop is harvested over a long period of time, it is comparatively non-perishable and it is possible to systematize the methods of handling, assemble the product in a central packing house and grade and pack it under standard rules. Without this standardization of handling, grading and packing, no co-operative association can acquire an asset in the reputation of its brands. With standardization, it can acquire a reputation which makes its output sought after and for which the trade will pay a premium. A practical difficulty in handling a co-operative association lies in the fact that every member thinks that he produces a product that is the equal or superior to that of every other member. The handling of this condition is one that tests the tact of the most successful manager. It is a practical condition, however, and not a theory that must be met with firmness, with justice and with patience by every co-operative association.

There are many other fundamental questions that might be discussed in this article. All of the important ones have not been touched, but the few that have been discussed are considered among the most vital to a co-operative organization.

Big Waste of Fertilizing Material

[Office of Information, United States Department of Agriculture]

SEVENTY-FIVE per cent of a highly valuable fertilizing material in the form of tankage and blood from the country slaughter of food animals is being wasted throughout the country districts. In addition $22,000,000 worth of ammonia from which ammonium sulphate, another valuable fertilizing material could be made, is annually wasted by the practice of making coke in the bee-hive type of oven, according to a recent bulletin of the Department of Agriculture.

Tankage, a product of slaughter houses consisting of such waste material as bones, horns, hoofs, hair, etc., contains a large percentage of nitrogen and other products used in commercial fertilizer, and in the larger packing houses is carefully saved. In country killing, however, only 25 per cent of the tankage and blood are saved for fertilizer. The nitrogen content of tankage is said to vary from 5 to 8 per cent and its phosphoric acid content between 5 and 12 per cent. Dried blood is perhaps the richest in nitrogen of all the organic materials used in the fertilizing industries. Unadulterated blood when quite dry contains 14 per cent of nitrogen, but as obtained on the market its content varies from 9 to 13 per cent. From the figures estimated by the Bureau of Animal Industry, Department of Agriculture, as representing the total slaughter of cattle, calves, swine and sheep in the United States, in 1912, it has been calculated that if all the materials rendered available by this slaughter had been saved and converted into tankage and dried blood, they would have produced 222,535 tons of tankage and 79,794 tons of dried blood. The introduction of a co-operative system among American farmers undoubtedly would result in an increased utilization of blood and tankage for fertilizing purposes. In Denmark country killing is being practiced on a co-operative basis in small country abattoirs and the blood is carefully preserved.

The loss of ammonium sulphate, which compares favorably with sodium nitrate as a plant stimulant, in the distillation of coal for the production of coke, is described in the bulletin as follows: "In the main, coal is distilled in this country in that form of coke oven, the bee-hive oven, which does not admit the recovery of the distillation products. Instead, they are allowed to go to waste. So we are indebted to the by-product recovery oven for the main supply of ammonium sulphate. The amount recovered is valued at about $4,000,000, while the recoverable ammonia annually destroyed in the coking processes by the bee-hive ovens is valued at $22,000,000. * * * * At the beginning of 1912 there were 4,624 by-product coke ovens in operation in the United States and 698 building."

The great product of Chile, sodium nitrate, possesses less nitrogen content (15.5 per cent) than ammonium sulphate. The United States, however, imports a great quantity (in 1911, 70,000 tons) for use in agriculture, owing to the deficient supply of other fertilizers in this country. This is only a small part of the total amount of sodium nitrate America imports yearly from Chile, as it has many other uses. The more intensive agriculture of re-

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

cent years has emphasized the demand for nitrates, and the fact that the Chilean beds of nitrates have been surveyed and figures have been obtained which make possible a fairly close estimate of the amount of nitrate remaining there, should stimulate the manufacture of nitrogenous substances suitable for fertilizer manufacture and serve as a warning against undue waste.

Artificial nitrates have become commercially important to supply the demand in this country, calcium cyanamide being perhaps the most nitrogenous material manufactured for fertilizer purposes. It is prepared from calcium carbide and free nitrogen, the latter being prepared from the atmosphere by the removal of oxygen. This industry is considered to be as yet only in its infancy, and with the increased capacity of existing factories and extensions now under way should prove an important factor in the present source of nitrogenous fertilizers.

Fall Plowing for Insect Pests

Fall plowing is one of the most effective remedies known for insect pests. It is, however, more of a preventive than a cure, for the insects destroyed by this method are, for the most part, in a dormant or resting stage, doing little or no damage, but getting ready for the next season's depredations. This remedy alone is not to be relied upon for the complete eradication of any insect, but as a supplementary method of combat it is of considerable value, and against some insects it is the remedy of first importance. All of the following insects, recognized as more or less injurious to various crops in our state, can be controlled to a considerable extent by fall plowing:

Colorado Potato Beetle. This insect is only too well known to people from the Eastern and Middle states. It has at last established itself in Washington. The mature insect is a half-round beetle about the size and shape of the half of a garden pea, and has ten longitudinal black stripes down its back. The larval stage is a plump, slimy slug found feeding on the potato leaves and vines. The insects winter in the ground and fall plowing will destroy many of them, but as the summer treatment is so effective, the practice of fall plowing is rarly followed.

Corn Ear Worm. This is the common injurious worm found in ears of corn, especially sweet corn, in all parts of the country. When fully grown the worms drop from the ear to the ground, where they remain over winter just beneath the surface. The very best treatment for this pest is fall plowing, which turns some of them to the surface, where they are killed by exposure to the weather, while others are turned under and crushed.

Cut Worms. These caterpillars are more or less injurious to most all kinds of garden, field and orchard crops. They work mostly at night, and hide in the soil during the day. They winter

in the ground. Fall plowing will not only kill many of these cut worms, but will also destroy any weeds upon which they might feed the next spring. In this way any worms not killed outright will starve the next spring or have to move to other land to obtain food.

Grasshoppers lay their eggs in the fall in the uncultivated ground, such as pasture land or wild scab land on the hillsides and along the roadsides and fenceways. Wherever the grasshoppers have been at all plentiful the past summer one should look for the female grasshoppers, with their abdomens sticking down into the ground, in the act of egg-laying. Where there are many of these females laying eggs in this manner the land should be plowed in the late fall to turn under the eggs and thus prevent a crop of grasshoppers the coming year.

Strawberry Crown Miner and Strawberry Root Borer. These two insect pests are well known to all strawberry growers. The only effective remedy for these pests is fall plowing of the infested patches. Plow up and destroy the vines found infested.

Tomato Worms. The large caterpillars commonly found destroying the tomato vines are, in most instances, easily destroyed by hand picking, but if it is practicable this treatment may well be supplemented by fall plowing to expose the "jug handled" pupæ overwintering in the ground.

White Grubs. These are the larvæ of the "June bugs" or "May beetles." They are most frequently found in new land. The most effective remedy for this pest is to break up the sod land in the late fall and turn hogs in on it to devour the exposed grubs. Late fall plowing alone will destroy many of the grubs, especially if the weather is very cold when the plowing is done and for some time afterward.

Wire worms are among the most difficult insects to combat. They are the long, slender, whitish brown grubs found in the soil in all parts of the country. The adult insect is the click or snapping beetle. The larva transforms to pupa in the fall and remain in that stage over winter. The most effective remedy for this insect is fall plowing. If this practice is followed for a couple of years the wire worms will be worked out of the land.

More detailed information on any of the above insects or any other injurious insects will be given upon request by M. A. Yothers, Assistant Entomologist Washington Experiment Station, Pullman, Washington.

Importance of Live Stock and Crop Rotation

The importance of keeping live stock and of practicing a rotation of crops in maintaining the producing capacity of the soil is becoming more apparent each year on the State College farm. Three plots show this fact very strikingly. One plot has been growing wheat continually every year since

1899 without any manure or other fertilizer being applied. The second plot has grown wheat every year since 1899, but has had a light application of manure plowed under each fall. The third plot has had no manure applied and has grown a crop every year, but a rotation of wheat one year, oats one year, clover two years and corn one year has been carried on since 1899, the 1914 crop being wheat.

The important lesson to be observed at this time is that the plot that has grown wheat continually without manure promises a very low yield. To the observer, the plot that has been manured and the plot that has not been nured, but has grown a rotation, show manured, but has grown a rotation, show an equally good growth of wheat at this time and show a better growth than they did fifteen years ago.

The plots show (1) that the fertility of the soil may be maintained either through the use of barnyard manure or by a rotation of crops that includes clover or some equally good soil-improving crop; (2) that it is kept in a high state of fertility. It is not necessary to practice summer fallowing with the rainfall received at Pullman, either to give the land a rest or to conserve the moisture of two seasons for the growth of one crop. If the soil is sufficiently fertile, one inch of rainfall may carry more food into the plants than two inches of rainfall may dissolve and carry to the plants from a very poor soil. This is beginning to be very apparent in the field practice on the college farm. Except in small experimental plots, summer fallowing is no longer practiced on the state farm, but a rotation is followed that involves cropping annually with clover, alfalfa and peas grown periodically to improve the soil and corn to serve as a soil-cleaning crop (corn is a soil-cleaning crop only when it is properly cultivated—corn itself has no effect in cleaning the soil).

One twelve-acre field lying on a south slope was in summer fallow in 1894. It has grown a crop every year since. Every five years a well cultivated corn crop has helped to keep the soil in good tilth and free from weeds, while peas and clover, interspersed at about like periods, have served to keep up the supply of nitrogen and humus. The field now produces much better than when it was first taken over by the college. In 1911 it yielded forty-seven bushels of wheat per acre. In 1912 it yielded forty bushels of peas per acre. In 1913 it yielded forty-six bushels of wheat per acre. At present there is an excellent crop of oats growing on this field that will produce a very satisfactory yield if the season is fairly normal from now till harvest.

The rich color and rank growth of nearly all crops on the farm are beginning to show the effect of the use of barnyard manure and the growing of peas, alfalfa and clover. One of the fields last purchased has not yet received a treatment of clover or alfalfa, and the yellower, more spinding growth of the barley shows a striking contrast to the ranker growth on the other fields.

The importance of maintaining a high state of fertility applies equally well to the semi-arid regions and to the moist regions of Western Washington. While it would be impossible to grow a good crop annually with the very limited rainfall of Central Washington, it is quite possible for the low rainfall to be much more efficient with plenty of fertility available to dissolve and carry to the plants. The number of crop failures can be very materially reduced and the average yields greatly increased by keeping more live stock, saving and applying the manure carefully and by growing soil-improving crops to keep up the fertility. Many sections of Western Washington might grow two crops per year or three crops in two years where they are now scarcely able to grow one good crop, if the soil were kept in a higher state of fertility. — Washington State Experiment Station Bulletin.

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

Unfermented Apple Juice

By Professor W. V. Creuss, University of California

THERE is probably more unfermented apple cider drank in the United States than all other unfermented fruit juices combined. Most of this is, however, used in the fresh state and at the time of the year when the weather has turned cool and the need of cold drinks is diminishing. If apples were abundant and cheap during the summer months there would be little need in preserving the unfermented juice; but since the fruit is scarce during the hot months and the demand for the juice should then be greatest, we should try to meet this demand by preserving the juice in the most acceptable form.

The problems that are presented in the manufacture of unfermented apple juice are practically the same as those met in the production of unfermented grape juice. They are, preservation of the juice against spoilage by molds, yeasts or bacteria; rendering of the apple juice permanently clear and bright, and retention of as much of the original apple flavor as possible without the introduction of any foreign flavors, especially the dreaded "cooked" taste. The production of a juice of maximum quality is the first and most essential step in the popularizing of any fruit juice and applies very particularly to apples.

Three methods are in use for the preservation of the juice against spoilage, namely, (1) refrigeration, (2) preservatives such as benzoate of soda, and (3) sterilization by heat. The first, refrigeration, is expensive and will keep the juice only temporarily. The second is unfortunately the prevailing commercial method of preserving apple cider. The preservation of the juice by use of benzoate in this way harms the growth of the industry immeasurably by restricting consumption of the juice. Furthermore, the maximum amount of sodium benzoate allowed by the United States government does not prevent spoilage of the juice permanently according to tests made by Mr. H. C. Gore of the United States Department of Agriculture. Juice in his tests treated with .1 per cent benzoate, the limit allowed by law, spoiled in six weeks. Thus, if the apple juice preserved with sodium benzoate keeps indefinitely in the bottle, the drinker may reasonably suspect that the juice contains more of the preservative than allowed by law. The use of benzoate is objectionable in every way and its use should be discouraged. The third method, involving destruction of the germs in the juice by application of heat and excluding their entrance to the juice thereafter, is the one we wish to take up more in detail, as it is the method that is most effective and least objectionable.

Selection of the apples is the first consideration. The varieties chosen should have good flavor and high

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

acidity. High acid is the main requirement because it improves the flavor by its tart taste, renders sterilization more effective and protects the flavor of the apple against injury during sterilization. The apples should also contain a fair amount of sugar. A desirable composition has been found to be 12 to 16 per cent sugar by the Balling test and over .5 per cent acid by chemical test. Of the standard varieties of California apples, the Pippin has shown up best in analysis. It is not the best variety of apple for the purpose, but as apple orchards are not planted for cider making we will have to use the apples that are available. They should be pickled according to chemical test or taste so that both acid and flavor will be obtained. It might be possible to use ripe apples to give flavor and blend them with slightly underripe apples to bring up the acid. The apples must be perfectly sound; blemished and dirty fruit, poorly flavored apples, etc., should be used for vinegar and not for cider. Moldy apples are objectionable further because they infect the juice with mold and make it difficult to sterilize. For the same reason all conveyors, crushers, presses, tanks, etc., used for the unfermented juice manufacture must be scrupulously clean. The press cloths especially should be washed and scalded before each day's run. The same machinery as used for apple vinegar making is employed to crush and press the apples. The grated or ground apples should be pressed in heavy press cloths so that the juice will have the smallest possible amount of pulp. The press cake can be fermented and repressed later for vinegar making.

From the time the juice leaves the press it must be handled with the objects of making it permanently clear and bright, retaining as much of the apple flavor as possible and preserving it against spoiling. The freshly-pressed juice is more or less viscous in nature and filters very slowly and imperfectly. It can be filtered clear, but only with great difficulty. Furthermore, when sterilized by heat it will turn cloudy again because of the material thrown out of solution by the heat. Therefore it becomes necessary to clear the juice after it has been sterilized. However, it is desirable to remove as much of the small pieces of pulp, starch grains, etc., that make the fresh juice cloudy, as possible, before it is sterilized the first time. This can be done by straining through a coarse filter, centrifuging in a milk centrifuge or by allowing the juice to settle for 24 to 36 hours. The last method is most convenient and most effective. During this settling process, fermentation must be prevented, because the gas of fermentation would keep the liquid stirred up and prevent settling. This can be done by the same method recommended for unfermented grape juice manufacture, namely, by the addition of a small amount of sulphurous acid. The amount used must be very small and only sufficient to prevent fermentation for 36 hours or less. The most convenient form in which to use it is

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

potassium metabisulfite, a solid salt of sulphurous acid. About two to four ounces of this salt dissolved in a little water may be used per 100 gallons of fresh juice. Sound, clean apples require less than dirty ones; less is needed in cold than in warm weather. In fact it is possible and would probably be better practice in cold weather to allow the juice to stand without any sulphurous acid because fermentation will not start in very cold weather in twenty-four hours if clean apples are used.

The settled juice may next be drawn from the sediment. It is then ready for sterilization into barrels. The sterilization by heat kills all of the molds, yeasts and bacteria in the juice and coagulates a considerable amount of the vegetable albumens in the juice, which, on settling out in the barrels, aid in clearing the sterilized juice. A pasteurizer or sterilizer made to sterilize the juice in a continuous stream is best, as in this way the juice is subjected to a very short heating and therefore is less apt to acquire a cooked flavor. The temperature of the juice that flows from the sterilizer should be between 160 to 170 degrees Fahrenheit. If much above 170 it will have a cooked flavor; if much below 160 it may contain living mold spores or yeast cells and spoil in the barrel. Such sterilizers are constructed of a tin or tin-lined pipe through which the juice flows and which is surrounded by a steam jacket to heat the juice. By varying the rate of flow and steam pressure, the desired temperature of the outgoing juice can be maintained.

The hot juice is run directly into sterile barrels. The barrels of hot juice must be bunged immediately. This may be done by use of a clean bung sterilized in boiling water and covered with a piece of clean cloth. The barrel should be rolled on its side temporarily to sterilize the bottom of the bung with the hot juice. The barrels used for the juice must be new or clean, sound barrels that have been used for juice only. Wine barrels that have been used for wine, vinegar, etc., are unsafe

for unfermented fruit juices because of danger from leaks or moldy wood.

The sterilized juice in the barrels may be left to settle for several months and then drawn from the sediment. It may then be filtered clear and bottled and sterilized in the same manner as the orange or grape juices. 160 degrees Fahrenheit should be sufficient for sterilizing the juice if all operations have been carried out carefully. Gore has used a temperature of 150 degrees Fahrenheit successfully in the sterilization of apple juice. Spoilage of juice in barrels may take place through yeast fermentation started by yeast that may get in through leaks in the barrel. Spoilage in bottles may occur through the growth of mold whose spores may have escaped death during pasteurizing of the juice in bottle. They may start from the cork if the cork is not thoroughly heated during sterilization of the juice. The bottle sterilizer must be so arranged that all parts of the bottle and cork get thoroughly heated.

The method in outline is as follows: (1) Selection of the proper fruit at the right stage of ripeness to secure over .5 per cent acid and over 12 per cent sugar by Balling test. (2) Crushing and pressing. (3) Settling of the fresh juice. (Prevent fermentation during this settling period by use of cold or a small amount of sulphurous acid; most conveniently done by use of potassium metabisulfite.) (4) Pasteurizing into barrels at 170 degrees Fahrenheit. (5) Settling in barrels for several months. (6) Racking and filtering. (7) Bottling and sterilization in bottle.

Let's Start Something

I have read with a great deal of interest your report of the horticultural meeting at the Agricultural Farm at Davisville, California. I regret very much that I could not have attended this meeting with you. Permit me to congratulate you on your suggestion that a horticultural meeting, in Oregon especially, be held at the Agricultural College. I would like to add to the suggestion that the Dairy Association, the Cattle Breeders' Association, the Chicken Breeders' Association and other allied organizations be joined in this annual meeting. In Oregon we are going to develop diversified farming which will include horticulture, dairying, hog raising, chicken raising and other similar lines of occupations, and there ought to be some place in the state where a ten days' meeting could be held covering all these lines of industries, so that people interested in horticulture and other lines of production could give up, say, ten days to attending a joint convention. Above everything else, let's have the next annual meeting of the State Horticultural Society jointly with the State Board of Horticulture at the College at Corvallis. I hope you will encourage this movement to a successful issue. Very truly yours, H. B. Miller, Director of School of Commerce, University of Oregon, Portland, Oregon.

Prevention of Wood Decay in Fruit Trees

By Professor W. T. Horne, University of California

THE decay and disappearance of wood in the center of large forest trees give us the well-known hollow trees. Such trees may live for many years, but are liable to be broken down or blown over. In our orchards also wood decay is common. Decayed orchard trees may live for some years and bear reasonable crops, but usually a heavy load of fruit breaks off one limb after another and the tree becomes a worthless stub. Peaches are especially subject to rapid loss in this way, but all our fruit trees are more or less affected by this plague. The decays considered in this article are those which start from some surface of dead bark or wood and spread through the center of trunk and limbs without affecting, at least for some time, the bark and cambium. This kind of decay should not be confused with the oak fungous disease which affects primarily the roots, but may spread up some little distance into the trunk. It affects perfectly sound and healthy roots and kills the bark, causing it to decay in a characteristic manner, and then spreads into the wood, causing a soft, light-colored decay. In contrast with the oak fungous disease, the common wood decays do not attack perfectly sound, healthy trees with unbroken bark, but the rot starts from some exposed wood and then works up and down through the center of the tree.

Fruit trees with decayed centers may bear heavily, but usually such trees rapidly become cripples. Not only is the carrying strength reduced, but there is good evidence that many of the dead limbs seen in orchards are due to wood decay which has worked outward to the bark. Mr. C. J. Rodgers of Watsonville, working in our laboratory, has shown that the so-called sappy-bark disease of apples is due to one of these fungi. That such decays are common is generally conceded, but no definite data have been available. Accordingly Mr. W. W. Thomas made careful counts in representative orchards in three regions, Coast valley, interior valley and foothills. While the results secured may not be at all final, they clearly show several facts with respect to stone fruits. (1) Contrary to anticipation, wood decays are more prevalent in the hot interior valleys and foothills than in the cooler and more humid Coast valleys. The winter moisture in the three regions is not very different, while the more frequent sunburn and wider cracking of large pruning wounds doubtless account for the facts found. Also in the orchards examined there had been less grafting over of bearing trees in the Coast region. (2) It appears that more than half the stone-fruit trees of bearing size in California are certainly affected with wood decay. (3) Not much more than two per cent of stone-fruit trees are free from sunburn or large wounds. (4) By far the largest part of infection comes from sunburn, large pruning wounds or grafting over stubs. (5) Fully two-thirds of the decay is caused by the common oyster-shell fungus, Polystictis versicolor. A dozen other fungi will probably include nearly all of the common wood decay forms in orchards. We believe wood decay is a trouble of stupendous importance to the California fruit industry. Professor Wickson says: "There are instances in the earliest settled parts of the state where peach trees above fifty years old are still vigorous and productive. * * * Some trees have, in fact, gone along in thrift * * * because they have never been allowed to sunburn; * * * have never been pruned with an axe, and have never lost a limb nor had a wound into which decay could penetrate and descend to the root."

Wood decay does not set in because a tree is old or ordinarily because it is weakened by lack of food or water. Neither is it a natural process necessarily following exposure to air and moisture. Serious wood decay is due to infection by any one of several fungi which gain entrance at some point where the wood is exposed or where the bark is dead. The fungus grows in the wood, digests it and uses it up, finally leaving only a little ash. This process of digestion constitutes decay. Infection must take place from spores

which fall on dead bark or into cracks of wounds. These spores are formed on definite bodies, of which the brackets or oyster shell-like structures are examples. The spore-bearing brackets grow almost entirely during winter, so spores will not be scattered during the dry summer. The spores must lodge in a moist crevice in order to grow and establish the fungus in the wood.

Prevention of ordinary wood decay depends wholly on protecting exposed wood from infection by spores of these fungi. Abundant moisture is doubtless also necessary. Measures will vary according to the kind of trees to be dealt with:

First, for small trees just planted the greatest importance attaches to shaping the tree so that later there will be no need to remove large limbs—in other words, get a simple framework. The tree should also be shaped for strength, so that neither the load of fruit nor orchard operations will be likely to break off large limbs. Wounds should be treated as recommended below, but it appears that wounds which heal over in one year rarely become affected.

Second, trees of some size which have wounds and are liable to infection but are still apparently sound. According to our studies this will include a little less than half our bearing stone-fruit trees. All horticultural procedure which I have seen recommended is inadequate for protecting these trees, and I take the liberty of suggesting a method on the basis of our present information: (a) When a cut or wound is made exposing the wood of a tree it should be wet with a germicide. This should be done immediately or as soon as the surface has dried and before cracks have formed. (b) Immediately after disinfection, as soon as dry enough, the wood should be covered with some sealing paint to prevent cracking as far as possible. (c) This process must be repeated for all wounds every year until they are healed over. The reason for this is that no sealing material can be trusted to last more than one season. (d) This operation should be done in late summer or fall in California. The reason for this is that cracks at this time will be at their widest and some spores may have gotten in. These must be killed and the places for entrance of others closed.

For the distinfectant (a) I recommend corrosive sublimate 1 part to 1,000 of water by weight. Corrosive sublimate is a poison and must be used carefully; it must not be put into a metal bucket nor come in contact with any metal or the solution will be spoiled. Wooden buckets or enameled ware without breaks may be used. For the sealing paint (b) I recommend asphaltum softened with benzoin to make a rather thick paint. This preparation is said to make a covering material which does not become brittle on drying, but becomes plastic in hot weather.

Third, trees already infected with decay are not to be cured by the above method. They are subjects for tree

surgery, which is entirely too large a topic for this article. Tree surgery in the orchards will pay if wisely done, sometimes. I cannot refrain from calling attention to three points: (a) Wood decays are greatly favored by excessive moisture, therefore make all cavities so that they will drain perfectly and remain dry as possible. (b) Where decayed wood is removed use disinfectant freely on the pared surfaces and paint as recommended for wounds. (c) Use cement only for support, never for sealing up a cavity. There will rarely be any occasion for its use

An Appeal From the Railroads

In anticipation of the heavy movement of fruit this fall the Association of Western Railways has issued a circular to all shippers and receivers, asking their assistance in the prompt releasing of cars. An excerpt of the circular is as follows:

"Two years ago, in anticipation of the large tonnage which the railroads would be required to move as a result of the heavy crops of that year, this association appealed to the shippers and receivers of freight for co-operation in obtaining the maximum use of freight equipment. The results of that appeal, and the interest manifested by the shippers throughout the country, were very gratifying. The present prospect of exceptionally heavy crops warrants an appeal of the same nature at this time. In spite of the fact that a great surplus of cars has existed for some time, the surplus of box cars is not so great as to warrant any feeling of security, and unless the co-operation suggested below can be had, the prospects are for a difficulty in moving these crops which may affect disadvantageously the interests of the shippers

and receivers alike. The railroads are making every effort which their resources will permit to put cars in condition for service and in other directions to prepare themselves to handle the traffic with promptness.

"Shippers and receivers, commercial organizations and others having to do with the commerce of the country, are earnestly urged to lend their efforts and influence in every way possible to bring about the most economical use of equipment, and the following suggestions are made, for which the widest publicity is solicited: (1) Move all the coal, lumber, cement and other supplies that you can before the heavy crop movement starts. (2) Load and unload all cars as quickly as possible. If, without additional cost, the use of greater force will get the load ready for movement or the car released more quickly, do it. (3) Load all cars to the full capacity. A leeway of 10 per cent above the marked capacity is permitted before reduction of load is required. All cars should so far as possible be loaded to a weight between the marked capacity and 10 per cent above. (4) Anticipate the disposition of freight before its arrival. (5) Only order such cars as can be loaded promptly. Orders for cars should state the number required for that day's loading, the kind of cars, the final destination of the shipment, and the routing via which it will move. (6) Reduce to the minimum the practice of billing cars to intermediate points to be held for reconsignment. The greatly increased crops cannot but be reflected in the movement of other freight, or fail to impress upon the minds of everyone interested in the subject the necessity for the most hearty co-operation on the part of all if a serious car shortage and its accompanying damage to all lines of trade is to be avoided."

Irrigation Congress

The first International Irrigation Congress in Canada, or, in fact, in any place outside of the United States, will be that in Calgary October 5 to 9 next. This congress promises to be one of the best ever held in the history of the organization since its birth in Salt Lake City, Utah, in 1891. It is especially appropriate that this congress should be held in Calgary, as this city is the western gateway to one of the largest irrigation projects in the world—a project on which many millions of money have been spent and which is one of the great factors in reclamation on the North American continent.

The visitors and delegates to the congress this year will have an opportunity of inspecting this project, with its many miles of ditches and tributary canals. A large number of inquiries have been received from persons interested in irrigation throughout the United States and Canada, and there is reason to believe that a record attendance will grace the 1914 congress. Every effort is being put forth by the local board of control to provide one of the best programs that has ever attracted irriga-

tionists to a convention. Entertainment and educative features will be interspersed in such a manner as to keep up the interest of the visitors and delegates throughout the whole four days of the session.

Men of such calibre as Hon. A. A. Jones, Assistant Secretary of the Interior of the United States, have been secured to address the gathering. The program committee has every assurance of his attendance at the congress, and also assurances from a large number of the best informed men in Canada on the subject of irrigation. These, with the large number of foreign delegates who are expected to attend the congress, will make a galaxy of irrigationists such as was never gathered together in one place before.

The program of this year includes some sectional meetings—sections devoted to one particular subject, so that delegates may make their selection as to their attendance when the subjects in which they are particularly interested come before the meetings. One section will be devoted to community up-building, as it is recognized that life on the farm must be made more attractive to the young people. Year by year the young folks are leaving the farm by thousands, city life being more attractive to them, and some methods must be devised to keep them on the land. There are those who have made a special study of this question, and they will be especially invited to attend the congress. Methods by which the city and the country may be brought closer together, socially and economically, will be discussed by those who are closest in touch with both phases of life and are in a position to talk intelligently on the subject. Canadians are alive to the importance of this meeting, knowing what it means to the city, and has meant to other districts where conventions have been held, and they will make every effort to royally entertain the visitors and delegates from across the border and from foreign countries. The country has every facility and attraction to offer visitors to the irrigation convention the best time they ever had.

One of the most interesting features of the congress will be the agricultural exhibition, at which a large number of states of the Union and provinces of the Dominion will be represented by exhibits. Both the Dominion and Federal governments have promised to send along their best products, while British Columbia, which is perhaps the most fortunate in the Dominion in regard to natural resources, will make an especially interesting exhibit. The land show will be most educative, representing as it will the tremendous advantages of the irrigation method of agriculture.

The big horse show building, which has the greatest accommodation of any building in the city, will be utilized for this purpose and for the various meetings of the congress, and will be so arranged that every state and province gets its due proportion of space for display purposes. Calgary is looking for-

ward to this event as one of the utmost importance, and will spare no effort to impress visitors and delegates with the natural advantages of Western Canada. That she will prove a most hospitable host is evidenced by the early preparation being made to look after the irrigationists.

Western Canada is very much interested in irrigation. She has through a succession of enterprises proved the methods of the science, and found that the scientific application of water to the land has much to do with the success of the agriculturist of the future. She has a Western Canada Irrigation Association of her own, and this organization, which meets in Penticton, B. C., August 17, 18 and 19, will see to it that British Columbia is well represented at the Calgary congress, both numerically and otherwise.

Pear Blight

The State Experiment Station desires to call the attention of horticulturists of the Northwest to the grave danger menacing the fruit industry in the shape of numerous and sundry alleged cures for blight (Pear Blight, "Fire Blight"). These cures take the shape sometimes of tree paints, sometimes of materials for injecting into the tree and sometimes of materials to be placed in the soil about the trees. It is the experience of scientific men, both in the experiment stations and the United States Department of Agriculture, that none of these so-called cures will do the work claimed for them. In other words, the are probably all pure fakes, and their use can only result in loss to the orchardist. The blight disease and its characteristics are well known to plant pathologists and horticulturists the country over. Its cause is well known and the methods of combatting it are well known. There is, therefore, little excuse for making mistakes in regard to combatting this disease. The only way to cure a tree of blight, once it is affected, is to cut out the infected portions. There is no patent cure. From the very nature of the disease it is improbable that there will be, and anyone who takes advantage of people in a time of distress such as a blight epidemic to work off patent cures or panaceas for the blight is, to say the least, a most undesirable citizen. It is unfortunate that our laws are not drastic enough to prevent the activities of these blight nostrum fakirs. It seems especially necessary at the present time to call attention to this matter on account of the fact that there is being exploited on the market certain "tree paints" as blight cures. One thing seems absolutely certain in regard to these "tree paints," namely, that if they will kill the blight bacteria in the tree they will also kill the tree, or that portion of it upon which the paint is placed. In other words, surgery would do the same work as such a paint, minus the cost of the paint, and probably do it more effectively.—Ira D. Cardiff, Director, Washington Agricultural Experiment Station.

Automobile Advice

In connection with the aid it has been giving the Lincoln Highway, from Coast to Coast, the Goodyear Tire & Rubber Company has just published a booklet that cannot fail to be of interest and help to Coast-to-Coast automobile tourists—especially those traveling by the Lincoln way. Most of the manuscript was prepared by F. H. Trege, chief engineer of the Lincoln Highway Association, Detroit, — an automobile engineer, a road expert and a man who has made the Coast-to-Coast journey many times by motor car. The booklet contains a map of the route, discusses routes, costs, time, equipment, advice for a variety of emergencies, provisions, etc. Here are a few "don'ts" that are put down which are likely to be as valuable as the positive advice:

"Don't wait till the gasoline is nearly gone before filling up. There might be a delay.

"Don't allow the water can to be other than full of fresh water and fill it every chance. You might spring a radiator leak or burst a water hose.

"Don't allow car to be without food at any time. (List of eatables given.)

"Don't buy oil in bulk. Buy one-gallon original cartons.

"Don't fail to have warm clothing. High altitudes are cold and dry air is penetrating.

"Don't carry loaded firearms in the car, except possibly a small pistol.

"Don't fail to put out your camp fire when leaving.

"Don't forget the yellow goggles.

"Don't ford water without first wading through it.

"Don't build a big fire for cooking. The smaller the better.

"Don't drive over 25 miles an hour. Unexpected, small, dry washouts in the West will break springs.

"Don't carry good clothes — ship them.

"Don't wear leather puttees. Canvas is better.

"Don't drink alkali water.

"Don't wear new shoes."

The book bristles with practical points for long-distance motorists. Copies may be obtained by applying to Goodyear at Akron, Ohio.

Windfall Apples

Windfall apples, which are often left on the ground to rot, may be made to serve a useful purpose by the economical housewife. A little forethought and labor at this time of the year spent on a despised product of the orchard may supply the winter table with many an appetizing and wholesome dish which otherwise would either be lacking or supplied at a higher cost. Windfall apples may be canned whole and used as a breakfast dish, for dessert, salads, or baked. There will be many which are too much marred for canning whole. In this case, the marred

places may be removed and the apples sliced and canned for either pie filling or for apple sauce. Following are the recipes for thus taking care of windfall apples:

Whole Windfall Apples Canned—Select firm, not overripe apples. A great difference in the canned products will be noted in the different varieties of apples. This recipe is intended for firm and preferably tart varieties. Some varieties will require less time and some more. Remove blemishes, cut out core. Blanch for two minutes in boiling water; plunge in cold water. Pack in tin cans or glass jars and add just a little very thin syrup. Put on rubber and top and partially tighten. (Cap and tip tins.) Sterilize twenty minutes in hot-water bath, fifteen minutes in water seal, ten minutes in steam-pressure outfit, or six minutes in pressure cooker. Remove jars, tighten covers and invert to cool. Apples canned in this way make a product that is generally wasted available for apple salads, dumplings, breakfast apple dishes, apple potpies and baked apples.

Windfall Apples for Pie Filling—Peel and core; slice; scald two minutes in boiling water; plunge in cold water; pack in glass or tin and add about one teacupful of hot, thin syrup to each quart; put on rubber and top, partially tighten (cap and tip tins); sterilize sixteen minutes in hot-water bath, twelve minutes in water-seal outfit, ten minutes under five pounds of steam, or four minutes in pressure cooker; remove jars, tighten cover, invert to cool. This is a good method of utilizing the good portions of partially decayed apples. The thin syrup mentioned in these recipes is made as follows: One and one-half cups of sugar to one cup of water, brought to boiling.

Boy Scouts to Can Windfall Apples—The Boy Scouts of Cortland, New York, have rented an entire apple orchard and are planning to market the good fruit and to can all the windfall apples in the manner described above. The orchard, which is being rented for a period of three years, contains 165 trees, most of them in good bearing. Under the leadership of one of the department's agents and the local scout master, the boys have pledged themselves to prune, spray and cultivate the orchard; to grade, crate and find a market for all fresh apples, and to save all possible waste by canning the windfalls, so that the enterprise will yield maximum returns. The boys are erecting a temporary building as headquarters for the equipment, where they may also change clothing, and grade, pack and crate the fruit.

List of Fairs, Apple Shows and Expositions for 1914

New Westminster, B. C., September 28-October 5.

Utah State Fair, Salt Lake, October 5-12.

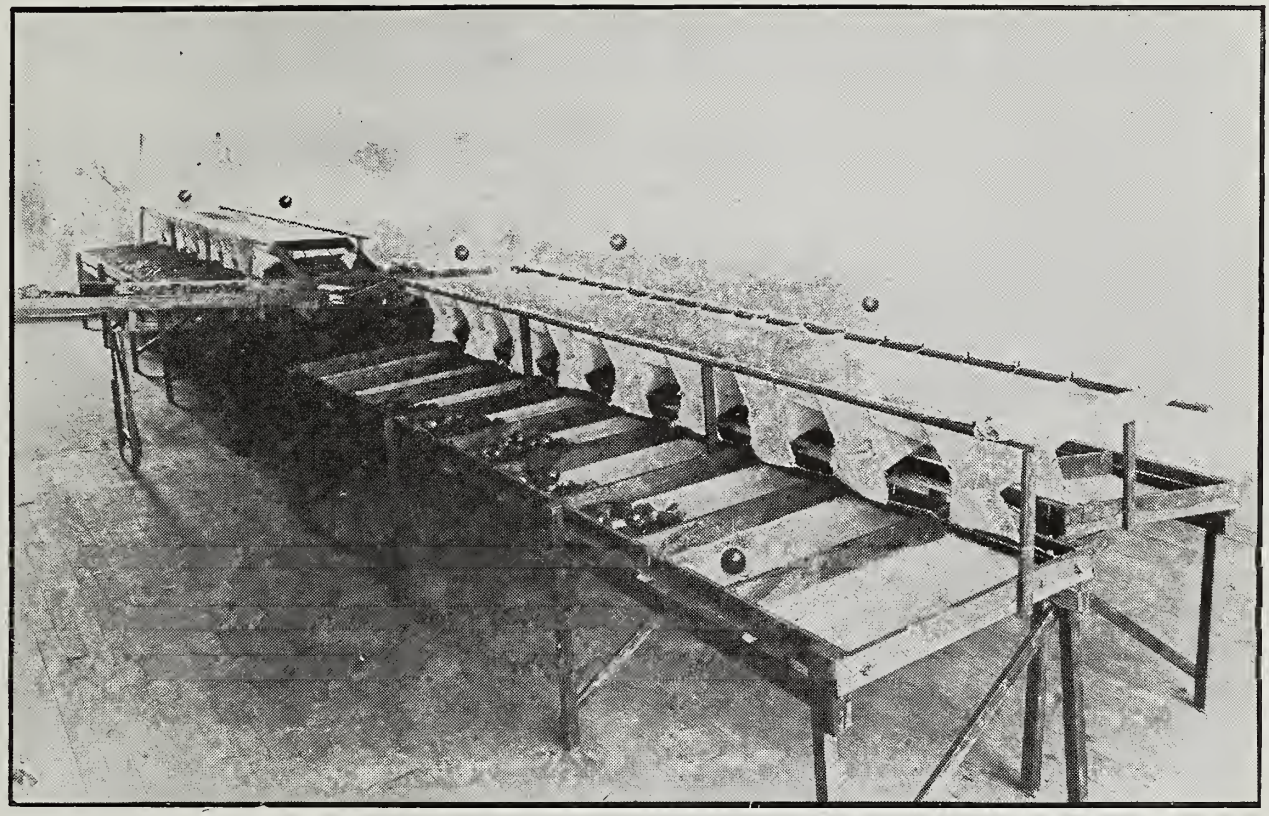
Fifth Annual Apple Show, San Francisco, October 1-11.

Manufacturers' Land and Product Show, Portland, October 26-November 14.

Sixth National Apple Show, Spokane, Washington, November 16-21.

The Four-Cup Price Fruit Sizer

Made in 4 sizes, with capacities ranging from 350 to 2,000 boxes per day, with price to meet every need.



OUR MOTTO—To reduce the cost of putting fruit in the box, so that even a child could do the work and obtain the perfect pack.

This machine will save you from three to five cents on every box you pack. Sizes your apples into the 20 Northwest standard packs. We furnish a system of packing cards that will enable you, with our machine, to make a packer out of an inexperienced person in one hour.

We size the fruit by weight, which is the only scientific and correct way. It makes no difference to this machine if the fruit is flat, oblong, round or square. It is extremely simple in construction and design, nothing to get out of order, and no mechanic necessary on the job to look after it. Our grading table is so arranged that one or six men can be used; after the fruit is emptied on the table, the sorter never picks it up again; he simply judges the color and grade, and it passes down to the sizer and is picked up automatically and delivered to the packing bins. One man, on our grading table, can do the work of three to five in the old way, and do it better.

One grower said his crop run 65% one size; from a box of his own pack, 138 size, we got 7 sizes ranging from 96 to 163; after the demonstration his expression was: "I see some light." No other machine on the market can duplicate the work it does. Read the following letters, which speak louder than pages of advertising can:

Price Fruit Sizer Co., North Yakima, Wash.

Dear Sir: Since installing the four single fruit sizing machines purchased of you we have had ample time to give them a thorough trial. We have run 16,000 boxes of peaches, early varieties, and the work is perfect, absolutely no harm to the fruit. We have used these sizing machines on early apples to our entire satisfaction. As to capacity, a single machine will size 1250 boxes of Elberta peaches in ten hours. We find by using these sizers we have reduced the number of employes on the floor of packing house and have also reduced the price paid packers approximately 33⅓%, and the packers are making as much money as they made formerly.

In the future our packing houses will be equipped with Price Fruit Sizing Machines, as they fill all the requirements. Yours respectfully, Thompson Fruit Co.

Price Fruit Sizer Co., North Yakima, Wash.

Gentlemen: From the time we first saw you machine in operation we were sure you had solved the problem of sizing deciduous fruit, although the principal, so far as we knew, was entirely original. After installing one in our warehouse we are thoroughly convinced that your machine will revolutionize the grading and packing of apples. Yours truly, Pacific Fruit & Produce Company.

Price Fruit Sizer Company

Designers and Manufacturers of Throwing Machines for Sizing and Sorting Apples, other Fruits, Vegetables and Nuts.

Works and General Sales Office, North Yakima, Washington, P.O. Box 934, Office No. 1 North Second Street

W. G. PRICE, President. W. K. PRICE, Manager Works. J. W. LAVIGNE, Sales Manager.